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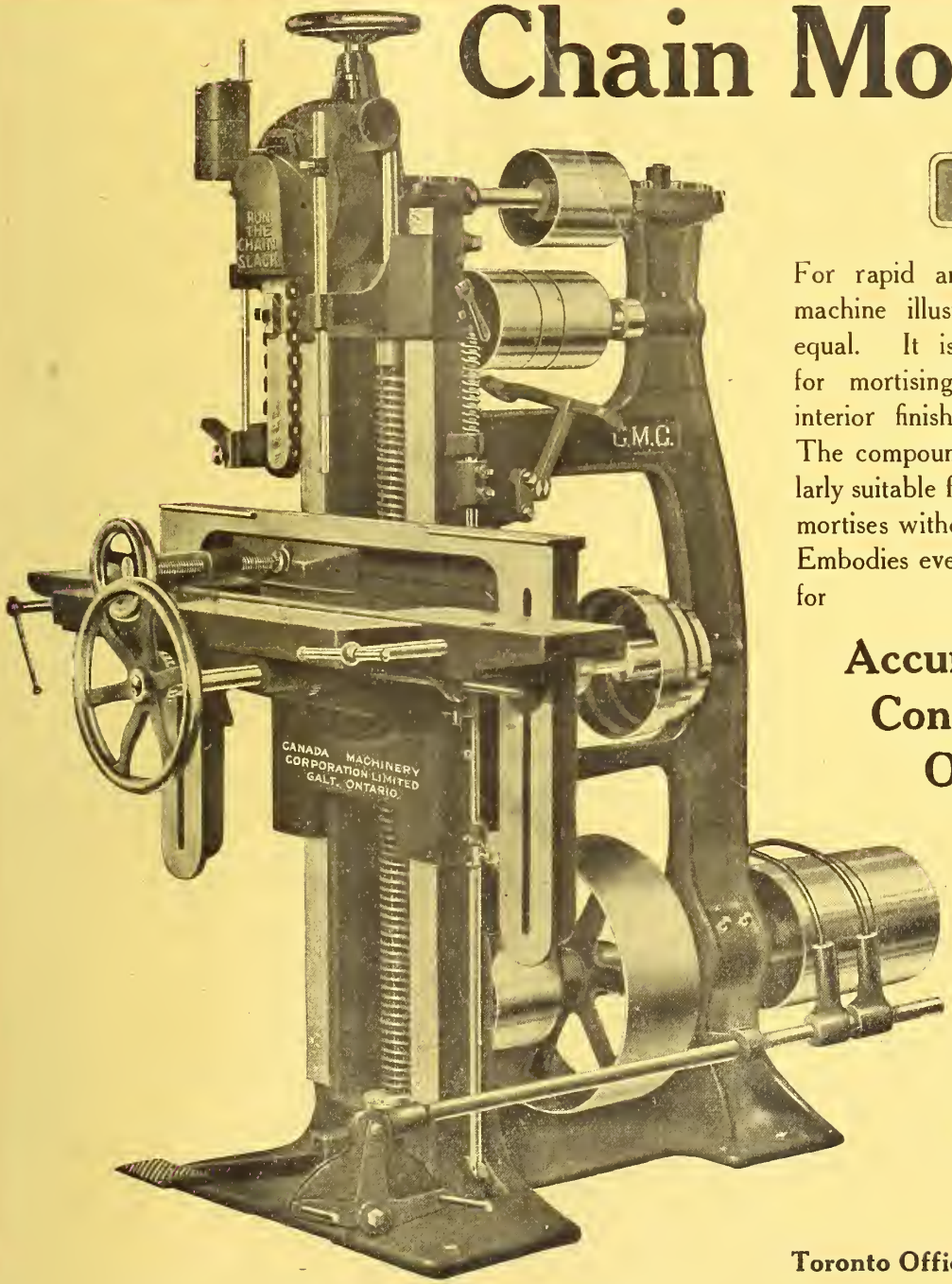
Volume Seventeen TORONTO, JANUARY, 1917 Number One

CANADIAN WOODWORKER and Furniture Manufacturer

Chain Mortisers

C.M.C.



Our No. 541 Chain Saw Mortiser

For rapid and economical work the machine illustrated herewith has no equal. It is 100 per cent. efficient for mortising doors, cabinet work, interior finish, furniture, pianos, etc. The compound table makes it particularly suitable for making long or adjacent mortises without unclamping the stock. Embodies every up-to-date improvement for

Accuracy, Speed, Convenience of Operation

Bulletins and full details sent on request.

Canada Machinery Corporation
Limited
GALT, ONT.

Toronto Office and Showrooms
Brock Ave. Subway

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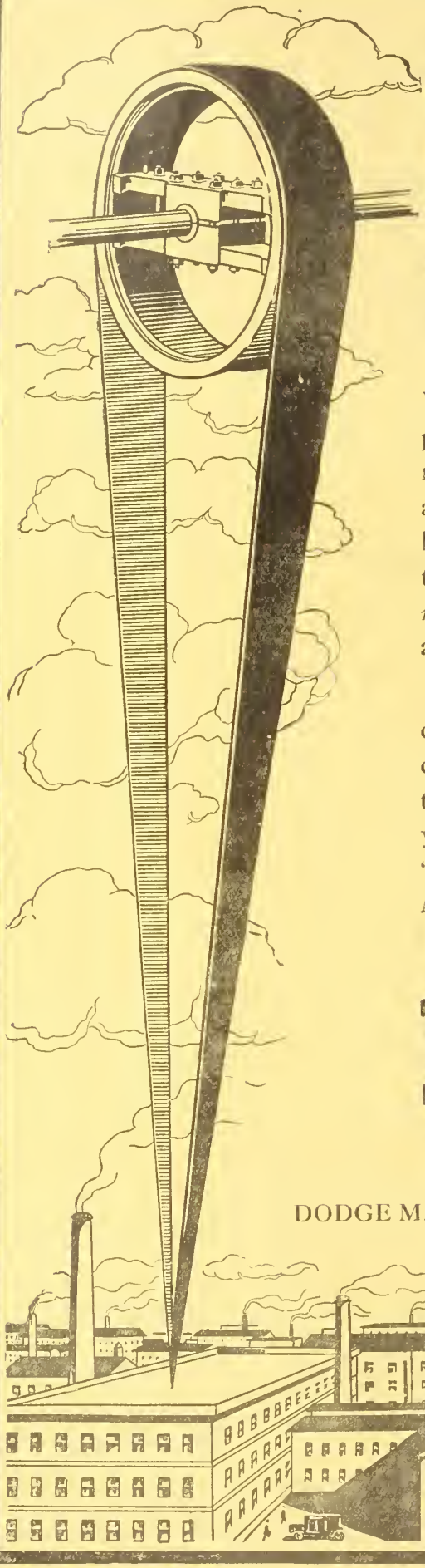


Power!

Who Pays the Power Bill? Who Pays for Pulleys?

YOU—the Management—pay for the power that drives your factory. And, remember—you pay for the power you *waste* as well as for the power you use. Exhaustive scientific tests prove conclusively that the actual cost per year for running *metal pulleys* as against *wood* pulleys averages *$5.00 per pulley.*

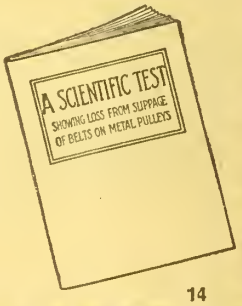
Dodge Wood Split Pulleys cost 40 per cent. less than metal pulleys and are 50 per cent. more efficient. They help you cut the cost of your power bills. Next time you require pulleys see that the "requisition" calls for ***Dodge Wood Split Pulleys*** and not for steel pulleys.

DODGE

WOOD SPLIT PULLEYS

DODGE MANUFACTURING CO., Limited, TORONTO

Every buyer should send for this book mailed Free on request



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GARLOCK-WALKER MACHINERY CO. LIMITED

32 FRONT ST. WEST, TORONTO TELEPHONE MAIN 5346

Do You Manufacture Furniture?

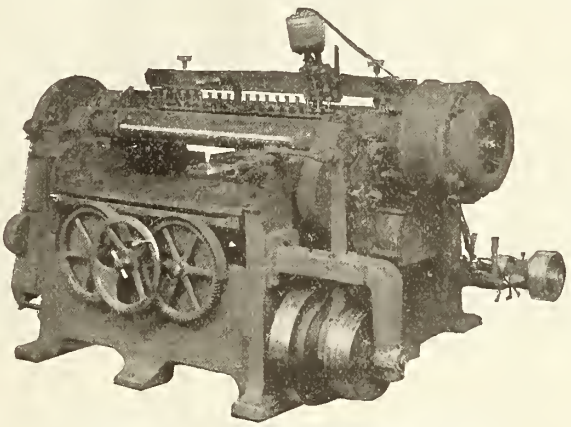
If so here is the very latest and most up-to-date **SURFACER** for your work—the best, the cheapest in the long run.

Feeds up to 85′ per minute.

Detachable Side Clamping Cylinder Boxes.

Round Cylinder

Knife Setter and Jointer.



American No. 444 Single Furniture Planer.

In Feed Rolls and Chipbreaker either solid or sectional.

Feed Rolls of large diameter—all powerfully driven.

Bed raises and lowers on long inclines.

Heavy Strong Durable

Does the best work at minimum expense

Let us take this up with you in detail—as well as offer you other tools of like calibre for your work.

WRITE FOR PRICES AND DELIVERIES

Garlock-Walker Machinery Co., Limited

Canadian Representatives

American Wood Working Machinery Co.

ROCHESTER, N.Y.

M. L. Andrews & Co.

CINCINNATI, OHIO

METAL and WOODWORKING MACHINERY of all Kinds

MR. MILLOWNER! Put a Medium Price "275" in your mill and get these results:

—No. 275's reputation is founded on actual results—in one mill it ran over eight million ft. 1" x 7" roofers in one year—in another it works anything from ½" ceiling to 16" x 8" sizing—in an implement factory it works 10" oak and hickory, four sides, taking a ½" cut, 3⅝" thick on the sideheads, and always does it satisfactorily.

—No. 275 in initial cost and operating expense is well within the means of every planing mill and factory owner.

—it will take care of all the work in the general planing or factory mill.

—it's a first class Matcher, a fine Floorer, a great Double Surfacer, and can be used as an Inside Molder for patterns up to 1¼" deep.

—it's double inside geared, all gears cut from the solid, both cylinders double belted, round heads, thin knives, jointers, grinders and all other modern features for the economical manufacture of lumber.

—No. 275 has made big money for every user —it will do it for you.

What your friends say about it:

"Dressing siding 1" x 6" 4 S over 1 M ft. per hour and 8" to 12" 2 S at over 2 M ft. per hour. Splendid results."
Lane Lumber & Milling Co., Munfordville, Ky.

"Averaged a carload of roofers per day for over a year. Finest Matcher of its size in the world—bar none."
Central Lumber Co., Round Oak, Ga.

"Our only trouble is getting enough lumber to the "275" to keep full."
Riverside Mill Co., Antiquity, Ohio.

"To say the least, we are well pleased. No. 275 is an all over good and durable lumber dresser."
Big Four Lumber Co., Coker, Ala.

"Work up to 16" x 8". Has the most wonderful feed for its size. If we could not secure a duplicate, would not part with our "275" for twice what we paid for it."
Shaw Bros. Co., Macon, Ga.

"Splendid Success. Very fine results at 120' per minute."
Pratt Mfg. Co., Coldwater, Mich.

"Very good service on 3" and 4" flooring and heavy overhead sheave timbers."
Otis Elevator Co., New York.

"Best machine of its size made. Takes a 1" cut on 12" board with top head. Does as good work as the high priced fast feeders, only not quite so much."
Toledo Lumber Co., Toledo, Ore.

"We certainly can clear up a lot of our greatly varied work in a short time on a "275."
Eureka Lumber Co., Boswell, Pa.

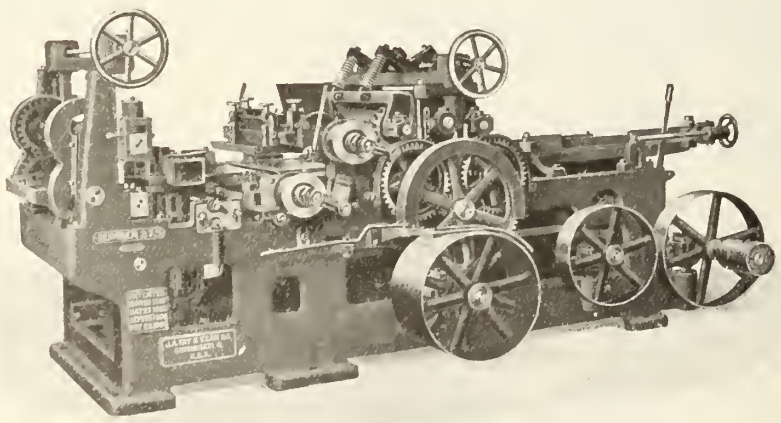
"We do everything that turns up in a retail yard on our "275" and recommend it highly."
E. R. Darlington Lumber Co., St. Louis, Mo.

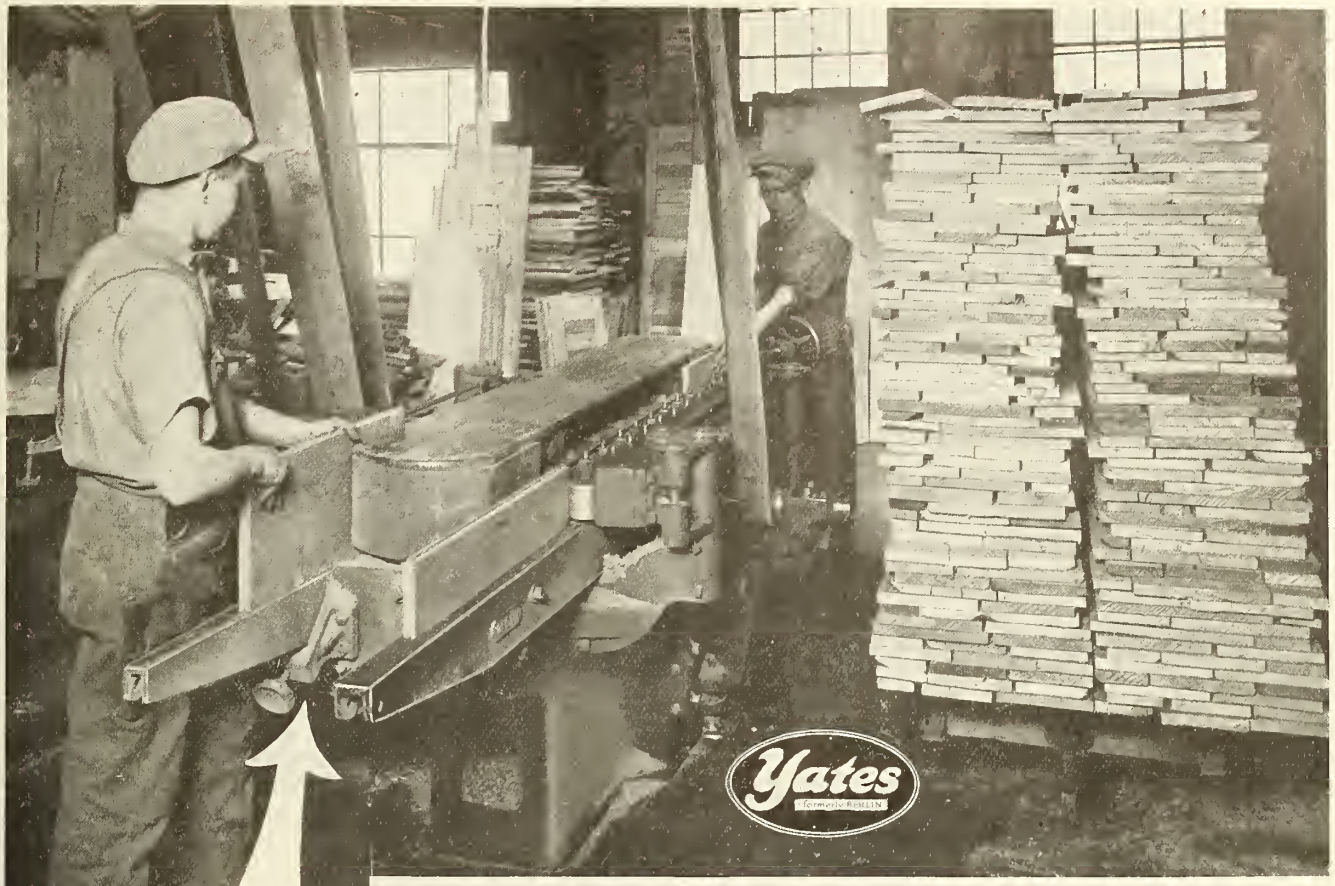
"Simple, strong and durable. Have had occasion to dress 16" x 8" and the "275" took care if it easily."
H. E. Buck Lumber Co., Lake Charles, La.

Ask for Bulletin C-8.

J. A. FAY & EGAN CO.

153-173 West Front St. - Cincinnati, Ohio





The Yates No. 213 as installed in the plant of the James Kennedy Funeral Supply Company, Philadelphia, Pa.

Consider This Detail

By means of the handwheel the infeed table can be instantly raised or lowered to accommodate the depth of cut to the work. No need to run slightly warped stock several times if you have a Yates 213 Glue Jointer. Eliminates loss of productive time. Makes it easy for the operator to do best work rapidly; keeps him contented with his job.

It is an Exclusive Adjustment

found only on the Yates Glue Jointer. There are others, besides—the unbreakable automobile chain feed—the eccentric bushings for aligning the table—the sliding head—arbor supports that make changes of bits so easy—and these are not all.

Investigate the Details

of the Yates Glue Jointer before installing. The development of the Continuous Feed Glue Jointer has reached that point where superiority is determined by the number of conveniences provided and the quality of material and construction. You should learn the total of the Yates Glue Jointer's exclusive features. When you have, you'll understand why hundreds of owners have chosen it in preference to any other.

Complete information is found in our Circular 213.
Sent free without obligation or expense.

P. B. Yates Machine Co. Ltd.

HAMILTON, ONT. CANADA

Successors to THE BERLIN MACHINE WORKS -- U. S. Plant: Beloit, Wis.

THE COMPLETE LINE

Top Bearing

PIANO CASTERS

Heavy Steel

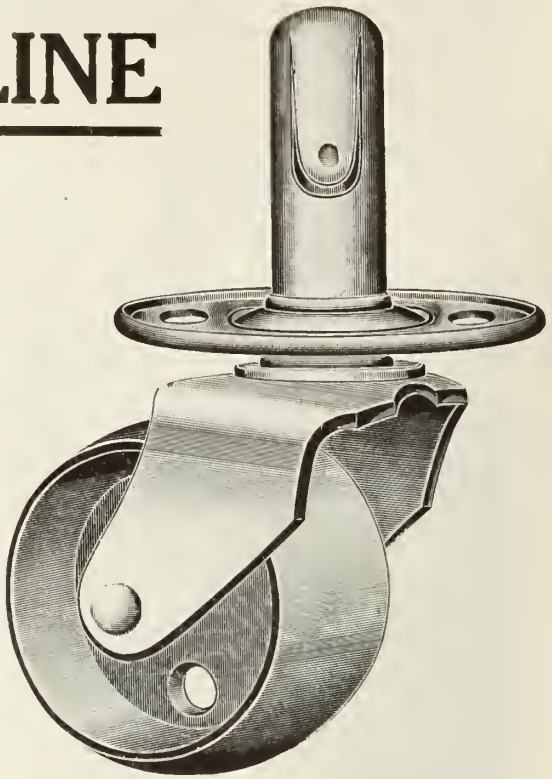
These Casters are sturdy, reliable and superior in every way.

The Top Bearing Socket enables them to swivel easily under the heaviest pianos.

Period Trimmings

in every style for all kinds of furniture.

Our Canadian representative is at your service.



No. 161—PIANO CASTER—Top Bearing

FOSTER MERRIAM & CO. MERIDEN, CONN.

Canadian representative—F. A. SCHMIDT, Kitchener, Ont.

Kitchen Cabinet Trimmings

In Many Designs and Finishes

Our cabinet hardware catalog shows these goods in detail. Send for copy for your file.

We have several new catches on the gravity principle—Get our samples and prices.

THE BURNS & BASSICK COMPANY, BRIDGEPORT, CONN., U. S. A.

Shimer Cutter Heads

Are you in need of Shimer Cutter Heads for V Sheeting, Shiplap, Box Board or Matching?

They are made to suit the individual requirements of the Manufacturer in the Planing Mill, Sash and Door, and Furniture Factories.

If you are interested in **Dado Heads, Shell Box Boring Heads, Planer Knives, High Speed Steel Knives, Planer Bolts, Solid Glue Joint or Shaper Cutters,** write for prices.

SHIMER CUTTER HEAD CO. OF CANADA, LIMITED

GALT, ONTARIO

Successors to Samuel J. Shimer & Sons, Inc.

You Should Use

Faultless Pivot Bearing Casters

Full Size C-3-5

Because:

The wheels used in these casters, regardless of size or kind, will last a surprisingly greater length of time than will the same kind of wheels, in non-pivot bearing casters.

SPECIAL NOTICE

FAULTLESS CASTERS received the Gold Medal, Highest Award, at the Pan-Pacific International Exposition, 1915, on "Furniture Casters of all Types."

Faultless Caster Co.

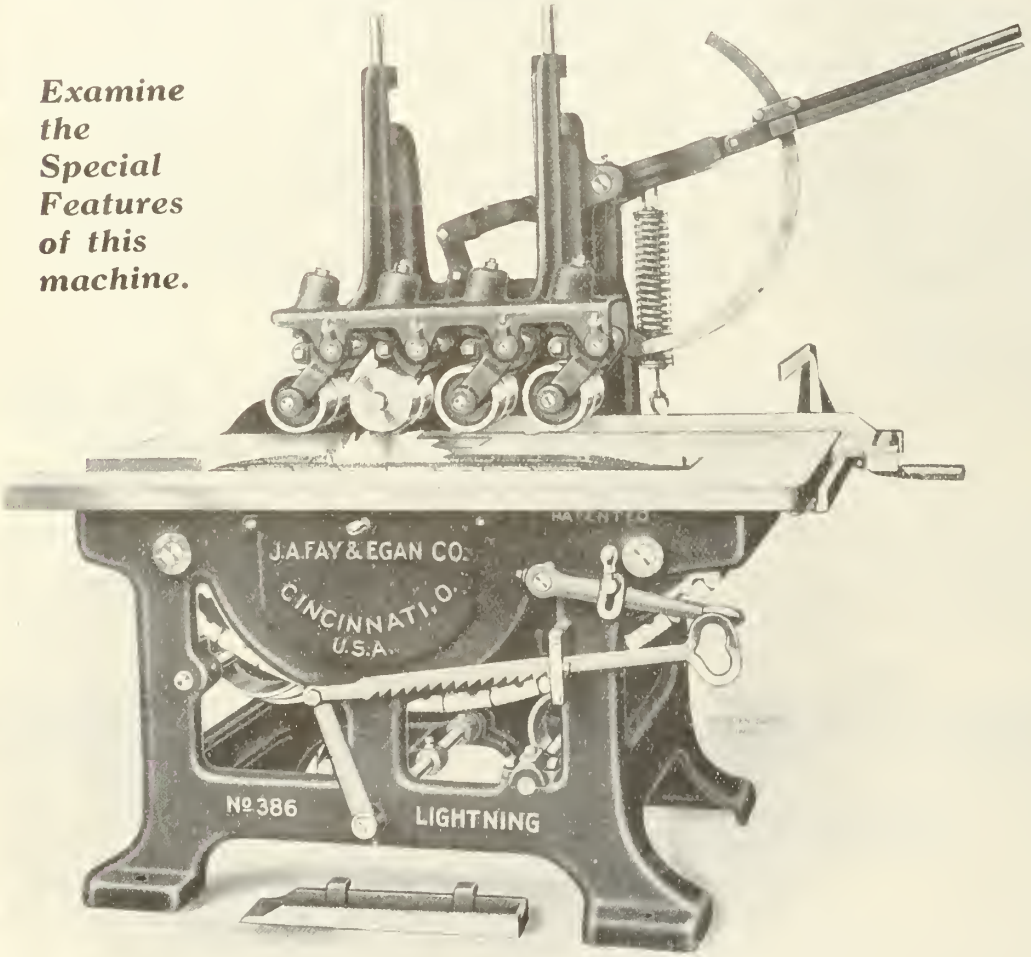
Evansville, Indiana, U.S.A.

"Move the FAULTLESS way."

New Straight Edge
Ripping and Jointing Machine

With saw cutting from below—the only mechanical way.
Double chain and idle pressure roll feed.

Examine the Special Features of this machine.



Prevents any twisting on either long or short stock.

Saw arbor easily accessible for oiling.

Double feed chain of flat milled links, each link removable and interchangeable.

Instantaneous adjustment of all rolls easily made and automatically locked at any point.

Spring counterbalance makes roll adjustment easy.

Saw blade easily accessible by removing plate.

Chain adjustable above table for rough, crooked, or finished stock.

No. 386 Straight Edge Ripping and Jointing Machine.

Saves 33⅓ to 50 per cent. in Wages, 10 per cent. in lumber and also uses up your waste stock.

NOTE—**Saw cuts from below** and all saw dust and slivers are drawn down and away from the saw and do not scatter over the work and get into the operator's *eyes, ears, nose and mouth*, as in the case where saw cuts from above.

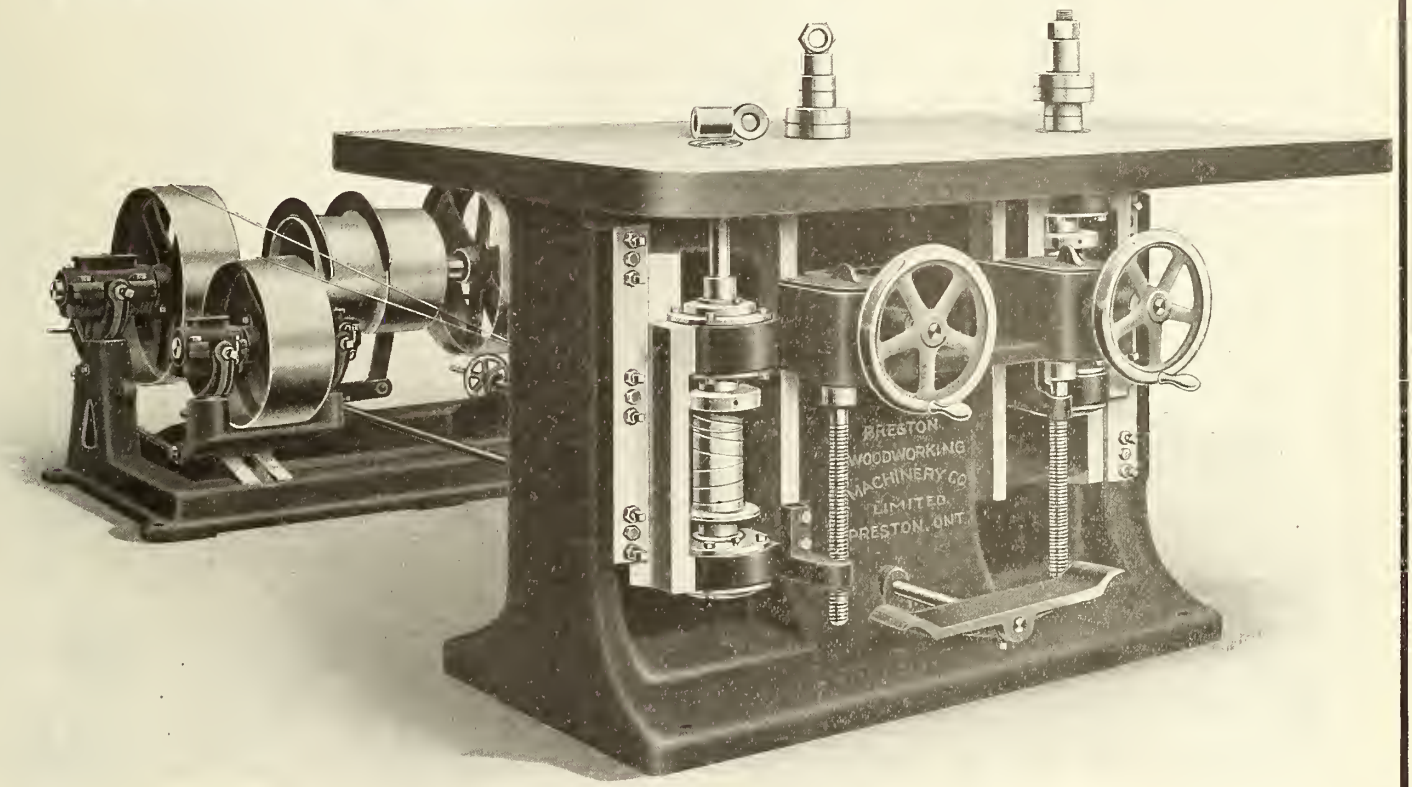
Circulars fully describing this new machine will be gladly mailed to all interested parties.

Jackson, Cochrane & Company
KITCHENER, ONTARIO

"Treat your machine as a living friend."

Don't Waste Time

for which you are paying big money by having a Machine in your plant which is not giving you a maximum of production every day.



No. 162 High-Speed Ball-Bearing Shaper

SEE THIS MACHINE!

It will turn out 100% MORE WORK than the ordinary shaper which you are now using. That's our claim; twice the amount of work and much easier on the operator. Is it worth your while to cut your shaper cost in two? If so, drop us a line for more particulars.

THE CHEVROLET MOTOR CO. ARE USING 6 OF THESE MACHINES IN THEIR PLANT AT OSHAWA

DIMENSIONS, WEIGHTS and SPEEDS

Floor Space, 120 in. x 58 in. Net Weight, 2650 lbs. Shipping Weight, 2750 lbs. Tight and Loose Pulleys on Countershaft, 10 in. x 6 in. Driving Pulleys on Countershaft, 18 in. x 5 in. Idler Pulleys, 14 in. x 5 in. R.P.M. Countershaft, 1200. Pulley on Spindle, 3⅛ in. x 6 in. R.P.M. Spindle, 7000. Diameter Spindle, 2 3/16 in. Spindle Centres, 28 in. Table, 58 in. x 41 in. Diameter Spindle Top, 1¼ in. Horse Power Required, 3. Front Projection, 17 in. Height, 35 in.

"The Machine you want in your plant is not the cheapest machine to buy but the machine that will save you the most money to use."

The Preston Woodworking Machinery Co. Limited, Preston, Ont.

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Edward Clark & Sons

Toronto

CANADIAN HARDWOODS—winter cut **Birch, Basswood, Maple**

Ontario and Quebec Stocks, East or West, rail or water shipment direct from mill to factory.

Our stocks in all kinds of Hardwoods at the present moment are so thoroughly depleted that we are unable to supply a comprehensive stocklist, and for the time being we can only solicit your enquiries for what you may require in the hope that we may be able to quote you from the items we have remaining on hand.

Wishing You the Compliments of the Season

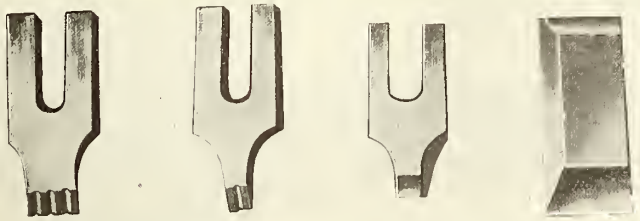
We Commend to Your Notice:

Our lumber is reliable, our grades uniform, our shipments prompt, and receive personal supervision; our prices consistent. We have had long experience. We desire to serve.

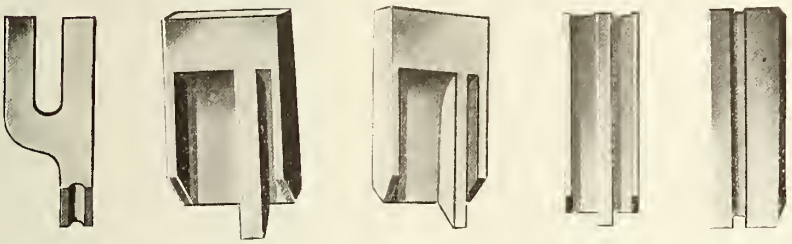
SIMONDS

Knives

For Planing and Moulding Mills, Box Factories, etc.



Beader Bits Groover Bit Straight Bit

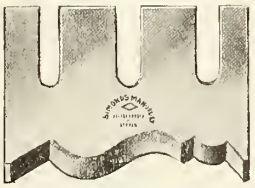


Beader Bit Milled Matcher Bits Tongue and Groove Bits

Planer Knife

Straight Knife

Moulding Knives



Moulding Knife

Untempered Moulding Blank

Saws

For All Purposes

It pays to use the better grade of cutting tools such as Saws or Planer Knives.

Write to us about any size or style. Remember we make Grooving Saws, Novelty Saws, Narrow and Wide Band Saws, Web and Scroll Saws, Swages, Saw Sets, Files, Hack Saws, etc. May we send you a copy of our catalogue describing the complete line we manufacture?

Simonds Canada Saw Co., Limited

Factory: St. Remi St. and Acorn Ave.,

St. John, N. B. **Montreal** **Vancouver, B. C**

British Columbia Douglas Fir

For

High Class Furniture and Interior Fitments

Buffet in British Columbia Douglas Fir
Period—Early English Designed by S. MacLure

The woods of British Columbia offer Manufacturers of Furniture and Fitments an excellent material at moderate cost.

Douglas Fir, Western Red Cedar, Western Soft Pine

All grown and manufactured in British Columbia, are available in abundance for genuine "MADE IN CANADA" products.

Samples, Bulletins, and full information will be gladly furnished on application to

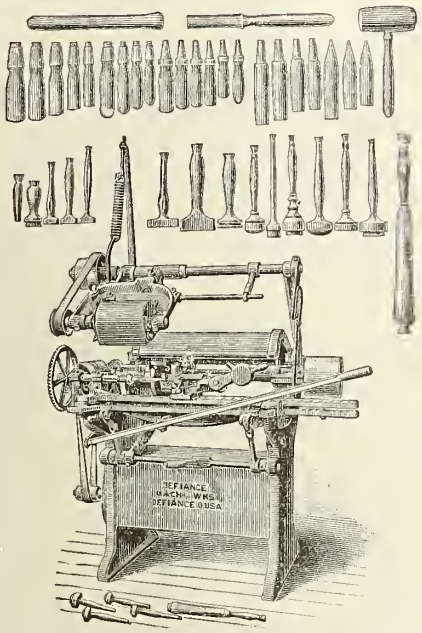
B. C. Lumber Commissioner

Excelsior Life Building,
TORONTO, ONT.

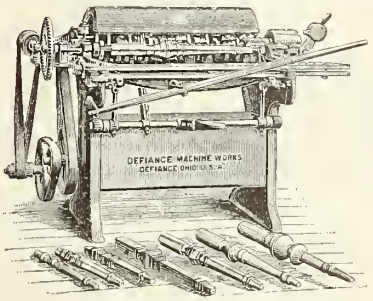
They Are Leaders In Production

IN ACCURATE SMOOTH WORK **IN FLEXIBLE ADJUSTMENTS**

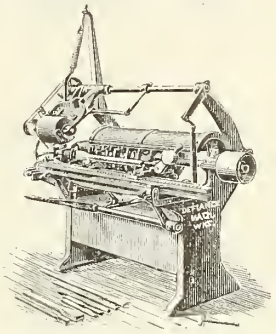
We have been making them for years, consequently know how. Have placed hundreds of them in every leading manufacturing nation throughout the world.



24 in. Patent Automatic Handle Lathe.



Patent Variety Turning Lathe.



42 in. Patent Automatic Handle Lathe

SPEED UP PRODUCTION on your small tool, hammer, hatchet, maul and pick handles in fact handles of every description, also on table legs balusters shrapnel plugs, dumb bells, ten pins, etc., etc. The illustrated machines will turn all the work mentioned and any similar work in a single operation—Each machine being built in seven sizes enables us to meet every requirement.

INSTALL DEFIANCE MACHINES and be equipped to compete with your best equipped competitor.

Write for descriptive matter and quotations to

The Defiance Machine Works

DEFIANCE, OHIO, U.S.A.

Everything in Woodworking Machinery — Over Five Hundred Designs.

BLACK WALNUT

12,000 ft. 4/4 Selects 6″ and up	140,000 ft. 5/4 No. 1 Common
23,000 ft. 4/4 Table Top Com.	14,000 ft. 6/4 Selects
19,000 ft. 4/4 No. 1 Common	160,000 ft. 6/4 No. 1 Common
35,000 ft. 4/4 No. 2 Com. Black	2,500 ft. 8/4 1 and 2
10,000 ft. 4/4 No. 2 Com. Sap.	5,200 ft. 8/4 No. 1 Common
13,000 ft. 5/4 Selects 6″ and up	10,000 ft. 8/4 No. 2 Common

Also

Kentucky River Oak

Canadian Representative:
A. E. KLIPPERT
11 Laxton Ave., TORONTO
Phone Parkdale 1354

Wire (at my expense) or write for prices for anything in above list

Leland G. Banning, CINCINNATI OHIO

St. Francis Basin
Selected Red Gum
ALL FIGURED WOOD

Quarter Sawn Mottled Stock	
4 4 No. 1 Common and Better	24,590
5 4 1st and 2nd	420
6 4 No. 1 Common	800
8 4 No. 1 Common and Better	8,240
10 4 No. 1 Common and Better	8,040
12 4 No. 1 Common and Better	720

Plain Sawn Variegated Stripes and Color Tones	
4 4 1sts and 2nds	9,125
4 4 No. 1 Common	64,490
5 4 No. 1 Common	4,125
6 4 No. 1 Common and Better	4,500
8 4 1sts and 2nds	16,420
8 4 No. 1 Common	16,780

Write or wire (our expense) for delivered prices. We have a large stock of Saps and Plain Gum. Ask for our stock list showing all items ready for shipment in Gum and Oak.

GEO. C. BROWN & CO.

Mill—PROCTOR, Ark. **Main Office—MEMPHIS, Tenn.**

We specialize in Tennessee Aromatic Red Cedar

Is it true that you have finally "got wise" to the fact that people of the finest taste have really been educated up to the unequalled beauty of good **RED GUM** furniture?

And that those dealers who sell it are doing a mighty satisfactory business, selling all the **RED GUM** FURNITURE they can get from the manufacturers who are smart enough to make it.

It is ALSO being used in a lot of the most recently designed BANKS for Interior Woodwork *in place of Mahogany.*

A wood that is good enough for a fine bank interior is worthy of the most careful application of the finest art of the best *Furniture Maker.* **RED GUM** gets it.

Why not *get in line* by getting in a stock of perfectly seasoned **RED GUM** from a thoroughly responsible manufacturer—one who takes personal pride in his product? (Beware of GUM from "hurry-up" manufacturers—who lack both capital and facilities for *properly* and *safely* producing this Finest of America's Hardwoods.)

Write us for Samples, Particulars and General Information.
Our reply will be Prompt, Personal and Dependable.

Gum Lumber Manufacturers' Association

1314 Bank of Commerce Building, Memphis, Tennessee

Dry Spruce and Birch

Good Stocks, Prompt Shipments, Satisfaction

C. A. SPENCER, Limited

Wholesale Dealers in Rough and Dressed Lumber

Offices—500 McGill Building
MONTREAL - - Quebec

Churchill Milton Lumber Co.

Louisville, Ky.

We carry at
NEW ALBANY, IND.

Genuine Indiana Plain and Quartered Oak, Poplar

At GLENDORA, MISS.

Cypress, Gum, Cottonwood, Oak

SEND US YOUR INQUIRIES

We have dry stock on hand and can make quick shipment

American Hardwood Lumber Co.

St. Louis, Mo.

Large stock of—

Dry Ash, Quartered Oak Plain Oak and Gum

Shipments from — NASHVILLE, Tenn., NEW ORLEANS, La., and BENTON, Ark.

THE

M. B. FARRIN LUMBER COMPANY

CINCINNATI - OHIO

Manufacturers

HARDWOODS

We have very large stocks of well assorted West Virginia Hardwoods on hand at Cincinnati and also at mills.

Plain Oak	Whitewood
Quartered Oak	Red Gum
Chestnut	Ash

KILN DRIED STOCK
A SPECIALTY

Huddleston-Marsh Mahogany Company, Inc.

Importers and Manufacturers

MAHOGANY

Lumber and Veneer

All Grades All Thicknesses

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15,000	"	6/4	No. 2	"
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1¼ in. FAS and No. 1 and 2 Com.	98,016
1½ in. FAS and No. 1 and 2 Com.	219,183
2 in. FAS and No. 1 and 2 Com.	746,966
BASSWOOD	
1 in. No. 2 Common and Better	20,000
BEECH	
1 in. No. 2 Common and Better	40,700
ELM	
1 in. FAS and No. 1 and 2 Com.	47,397
1½ in. FAS and No. 1 Common	33,671
2 in. FAS and No. 1 Common	116,782
2½ in. FAS and No. 1 Common	14,019
3 in. FAS and No. 1 Common	60,099
GUM	
1 in. FAS and No. 1 Common Red	26,000
1 in. FAS and No. 1 Common Sap	169,690
1 in. Boxboards	38,905
HARD MAPLE	
1 in. FAS and No. 1 Common	29,980
SOFT MAPLE	
1 in. FAS and No. 1 Common	20,700
1½ in. FAS and No. 1 Common	9,340
2 in. FAS and No. 1 Common	12,000

	Feet
PLAIN OAK	
1 in. FAS and No. 1 and 2 Com.	1,627,293
1¼ in. FAS and No. 1 and 2 Com.	364,386
1½ in. FAS and No. 1 and 2 Com.	219,539
2 in. FAS and No. 1 and 2 Com.	988,180
QTR. RED OAK	
1 in. FAS and No. 1 Common	30,880
1¼ in. FAS and No. 1 Common	8,500
1½ in. FAS and No. 1 Common	22,500
2 in. FAS and No. 1 Common	3,000
2½ to 4 in. FAS and No. 1 Common	3,500
QTD. WHITE OAK	
1 in. FAS and No. 1 Common	203,528
1¼ in. FAS and No. 1 Common	21,500
1½ in. FAS and No. 1 Common	20,500
2 in. FAS and No. 1 Common	29,500
POPLAR	
⅝ in. FAS and No. 1 Common	17,200
1 in. FAS and No. 1 and 2 Common	739,736
1¼ in. FAS and No. 1 and 2 Common	66,156
1½ in. FAS and No. 1 and 2 Common	238,550
2 in. FAS and No. 1 and 2 Common	114,874
2½ in. FAS and No. 1 Common	48,590
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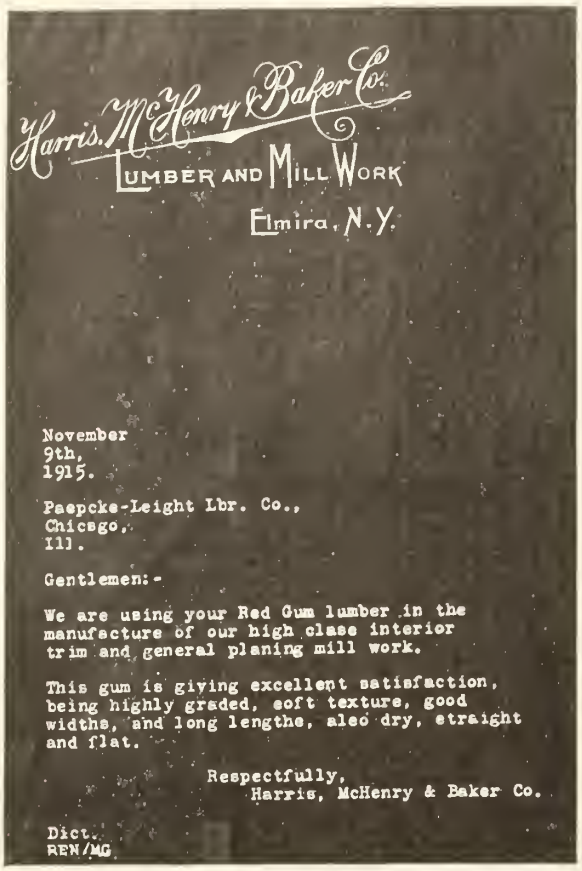
Harris, McHenry & Baker Co.
LUMBER AND MILL WORK
Elmira, N.Y.
November
9th,
1915.
Paepcke-Leight Lbr. Co.,
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Ill.
Gentlemen:-
We are using your Red Gum lumber in the manufacture of our high class interior trim and general planing mill work.
This gum is giving excellent satisfaction, being highly graded, soft texture, good widths, and long lengths, also dry, straight and flat.
Respectfully,
Harris, McHenry & Baker Co.
Dict.
REN/MG

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RED GUM

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Just as a poor cook will spoil the choicest viands while the experienced chef will turn them into prized delicacies, so it is true that

The inherently superior qualities of Red Gum can be brought out only by proper handling.

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We claim genuine superiority for our Gum. The proof that you can have confidence in this claim is shown by the letter reproduced herewith.

Your interests demand that you remember this proof of our ability to preserve the wonderful qualities of the wood when you again want RED GUM.

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A Monthly Publication in the Interest of the Woodworking Industry.
Reaches the factories producing interior finish, doors, sash, flooring, woodenware, furniture, pianos, boxes, and general mill products.

Subscription, $1.00 a year; foreign $1.50.

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Labelling Goods

It would be easy to understand the motive of a firm that took a foreign-made product and labelled it "Made in Canada," but an instance that was brought to our attention a few days ago of a large firm buying a "Made in Canada" product and labelling it as foreign-made is pretty hard to understand. The circumstances of the case are as follows: A Canadian firm manufacturing willow furniture from Canadian-grown willow sold some of their product to a large departmental store. In passing the store a few days later one of the partners in the firm was attracted by a window display made up of some of the stock purchased from his firm, together with a few pieces of some other make, and labelled "The Finest Japanese Art." He was indignant, but at the same time reluctant to say anything, as the store in question is a pretty good customer of the firm's.

What could possibly be the motive for attempting to pass the goods off as Japanese Art? We do not remember ever hearing that Japan had any medals for the production of willow furniture. Neither do we believe that the name would attract buyers quicker than a "Made in Canada" label. It is therefore a difficult matter to understand why Canadian manufacturers and workmen cannot be given credit for their work.

It is safe to say that the products manufactured and sold to-day under a "Made in Canada" label compare favorably with those of a similar nature being manufactured elsewhere. While we believe that the case mentioned above is an isolated one, and that the majority of storekeepers find the "Made in Canada" label a good selling point, yet an educational campaign among the storekeepers would be a good thing. One of the very best preventatives of substitution is advertising. If the manufacturer will advertise, while still putting the quality into his product, it will become so well known that it will be impossible for the dealer or storekeeper to hide the product under another name or substitute another article for it. Apart from that, once a favorable name is established for an article, and it is in demand, no storekeeper would want to substitute another for it, unless the substitute yielded a larger profit. Even then he would not be very likely to do it, as the manufacturer would soon find out and refuse to sell any more goods to him, in which case his competitor would get the business.

Canadian manufacturers, almost without exception, are striving to make "Made in Canada" an indication of quality, and when they achieve something, we see no reason under the sun why their product should be introduced to the public under a foreign appellation. There may be some people to whom a foreign name looks attractive, but we are inclined to think that they are in the minority at present.

Female Labor in Woodworking Factories

So far there has been very little relief in the labor situation, except for those firms that have stepped out from the beaten path and made use of women in their factories. The manager of a large furniture factory, in discussing the labor question a few days ago with the editor, said: "We have women working in every department of our factory. In the machine room they are working as off-bearers. In the cabinet room they are operating sanding disks, spindle sanders, etc., and performing numerous tasks for which men were formerly employed." He stated, however, that their greatest sphere of usefulness is in the finishing room, and that there are very few jobs in this department that cannot be handled successfully by women.

When asked if any special precautions had been taken to prevent the women and girls from getting their skirts "mixed up in the machinery," the manager quoted above replied that he had made no extra provisions for their safety. He said he simply cautioned them and emphasized the "safety first" principle, and that so far they had apparently adhered closely to his instructions.

Elsewhere in this issue will be found an illustrated article showing what women and girls are doing in England in the manufacture of ammunition boxes. They are operating machines and carrying on practi-

cally the whole process of manufacture. The adoption of female labor in England was absolutely necessary, as every available able-bodied man has been called on for military service. In Canada it may not be necessary to employ women to such a large extent as in England, but there is no doubt that much could be done to overcome the labor shortage by engaging them for the lighter operations and for work not requiring a long course of training. Some of the leading manufacturers of toys and novelties prefer girls to boys or men, because their fingers are more nimble for handling small parts, and consequently they can turn out a greater volume of work.

Speeding Up Production

Now that the yearly or half-yearly inventories have been taken and furniture factories are starting off with a clean sheet, no doubt a great many superintendents will be up against the problem of beating their previous year's performance. Increased cost of materials and shortage of labor makes it absolutely essential to produce at the lowest possible price. To do this requires that production be increased to the highest possible point per man.

Many factories are faced with the problem of turning out as much with a small organization as they formerly did with a large one. One superintendent that we know of was requested by the management to turn out 200 per week extra of a certain article if it was humanly possible, and this together with what was already going through the factory. To all appearances the factory was running to capacity, yet he was asked to increase the production without increasing the capacity of the plant. The superintendent solved the problem by taking each machine in turn and studying them for an entire day. From his observations he learned that each of the machines was stopped for a few minutes at a time several times through the day to wait for stock. He also observed that some time elapsed after these shutdowns before the machines were again running to full capacity.

After securing this information the superintendent drew a floor plan of the machine room and then, by shifting two of the machines and carefully routing the stock, he was able to take care of the extra work. With the new arrangement it was not necessary for any of the machines to be stopped even for a minute to wait for work. In talking about this incident, the superintendent in question said the best feature of it for him was that the firm appreciated it. They didn't increase his salary, but nevertheless they showed their appreciation. The manner in which the words were spoken led one to believe that in this factory co-operation was a known quantity.

The above example of beating a previous performance is not given because we believe that every factory can do the same thing. They can't, because with some it is practically impossible to increase the output. The point to be brought out is that the problem should be examined from every possible angle. When this has been done and no solution found, there is no further use to worry, because nothing can be gained. But if the problem is studied thoroughly it will generally be found that there is some point, previously overlooked, where an improvement can be effected. Sometimes the replacing of one machine with one of a more modern type will make a remarkable difference in production. A new type of sander was responsible in one factory for a saving of something like $1,500 in one year in labor alone. This kind of thing requires that a superintendent be a thinker, and that he keep in touch with new developments in machinery.

Too many superintendents stick so close to their work, occupying their minds with details, that they are not in a position to give concentrated thought to the various departments to plan out methods of speeding up production. They are too full of what they are doing to see what they could do. For these men a good policy is to get away occasionally out of their own factory to see what other men are doing. Now that the association idea has taken pretty good hold on manufacturers, we would suggest that they make arrangements to hold a convention of factory superintendents and foremen annually or semi-annually, to discuss the practical manufacture of furniture. The whole thing could be carefully planned by the association secretary and arrangements made to have papers read on various phases of the work.

If manufacturers themselves need the inspiration and ideas that can be gained from association with other men in their own line of business, how much more the superintendents and foremen need it. Usually, the lives of the latter are extremely narrow. They are tied up in the factory all the time. A couple of days fraternizing with men from other parts of the country, mixing some social pleasures, theatre parties, etc., in with the exchange of practical ideas, would give fresh impetus to the work. In our opinion, manufacturers would be spending their money to good advantage by sending their superintendents and foremen to such a convention. It would not be necessary to close down the factories, as, if the conventions were held semi-annually—half the foremen could attend one convention and the other half the next.

No honor, no reward, however great, can be equal to the subtle satisfaction that a man feels when he can point to his work and say: "The task that I promised to perform with all loyalty and honesty to the utmost of my ability is finished."—Stanley.

One good way for the sawmill men to improve the value of lumber is to hold the production down to the needs of the country, and this should also make it easier to do better work with saws and planers.

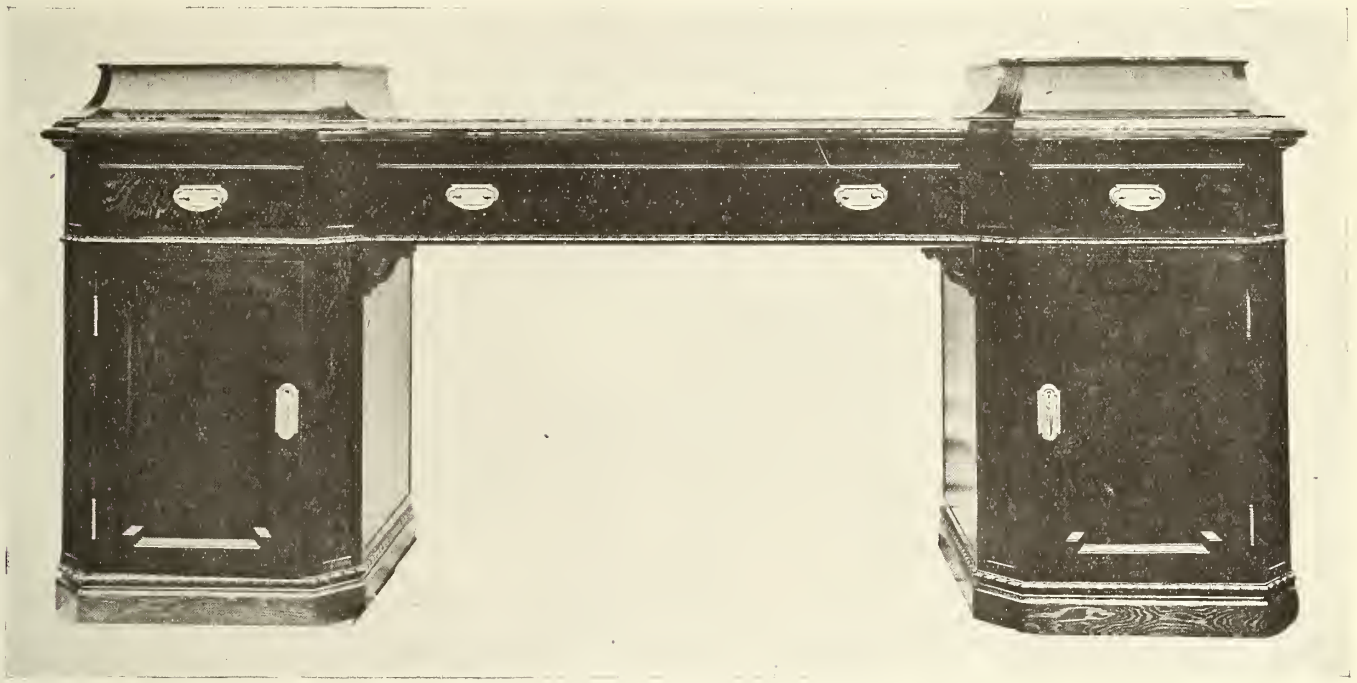
British Columbia Douglas Fir for Furniture

The buffet shown in the accompanying photograph was made entirely of British Columbia Douglas fir, and shows the pleasing results that can be obtained with that wood in the manufacture of furniture. The buffet was built to order and was designed by Mr. S. MacLure, a noted architect and designer of Victoria, B. C. Mr. MacLure has shown excellent taste in his choice of a design, and his skillful treatment is seen in the splendid proportions of the case.

The design is in one of the early English periods, and the buffet is finished in a soft walnut color with a flat, or dull finish. This brings out the delicate marking of the wood and makes a very handsome finish. All the framing is edge grain stock and all panel, frieze, and table work is of three-ply rotary cut veneer. The length of the case is eight feet; the height is three feet eight inches, and the pedestals are two feet square.

The photograph clearly shows the adaptability of Douglas fir for high class refined work. This wood has been used quite extensively in the Western States for the manufacture of furniture. Recent figures give the value of the lumber thus consumed at considerably over $2,000,000. In our own country, in the province of British Columbia there is almost unlimited supplies of Douglas fir. The price is very reasonable in comparison with other furniture woods, and Canadian manufacturers taking up the manufacture of Douglas fir furniture would no doubt find a wide and profitable market for their product.

In the office of the British Columbia Lumber Commissioner in the Excelsior Life Building, Toronto, can be seen several pieces of furniture made in Douglas fir. There is a large settee, suitable for verandah, den or living room, and a chair to match. Also, there is an extension table of modern design, with a centre pedestal and band sawn feet. These pieces are finished in an attractive brown shade and present a very pleasing appearance. Mr. L. B. Beale, the British Columbia Lumber Commissioner in charge of the Toronto office, in discussing the suitability of Douglas fir for furniture making, said that the settee, chair and table mentioned above, were shown at the Toronto Exhibition last fall, and that they drew forth many favorable comments from visitors.



Buffet made from British Columbia Douglas fir.

Fruit Package Meeting

The annual meeting of the National Basket and Fruit Package Manufacturers' Association was held at the McAlpin Hotel, New York City, November 15-16. The meeting was well attended and some interesting discussions were held. One of the most important features of the convention was an address relating to the use of second-hand packages.

It was declared that this was one of the most important questions that the association would have to deal with in the future, and that some action should be taken to stop the usage of second-hand packages.

It was further declared that from a sanitary standpoint it should be brought before the board of health officials in every city, and that the fact should be pointed out to them that packages, after being once used and stored away for another season, where birds, mice and other sorts of vermin use them for winter quarters, were a menace to health.

The speaker expressed the belief that a great number of cases of infantile paralysis might be traced to the impurities of the containers in which fruits and vegetables are sold. He further stated that firms have been established in the different cities for the specific purpose of buying up old fruit and vegetable packages and reselling them again, and gave as his belief that much could be done to stop this evil if proper representations were made to the board of health authorities in the different cities.

After some discussion, a committee of three was appointed for the purpose of taking such steps as they thought necessary to curtail at least, and possibly stop the practice.

The Woodworking and Furniture Outlook for 1917

A Continuation of the Letters Published in the December Issue—Demand for Furniture Good in Quebec and Nova Scotia—Furniture Manufacturers' Association Hope to Obtain Remunerative Prices—Planing Mills Doing Steady Business—Building Active in Cities Where Munition Plants are Located

The demand for furniture is great, in fact better than ever before, and the recovery, mostly, is greater in the Western Provinces, but prices of raw materials and wages are very uncertain, as they are ging up by leaps and bounds. Still, we believe that the spring trade will be better than ever as the furniture dealers generally are in a healthy condition.

We should get remunerative prices, as the demand will be great, and if the disease of cutting prices, etc., by some manufacturers (which we hope is not chronic) could be cured, the manufacturers would reap benefits of legitimate prices, as in other lines.

We believe, however, that the Eastern Section of the Furniture Manufacturers' Association will soon obtain good results, which we are certainly looking for.

St. Lawrence Furniture Company,
Riviere-du-Loup, Que.

* * *

We think that, owing to scarcity of labor, caused by recruiting and high wages being paid by the munition manufacturers, the lack of workmen is the great problem. Not that we think for one moment that workmen are receiving too high wages, because we think they are entitled to every cent they receive. They are just coming into their own, and, even after the war, we do not think wages will be materially lessened.

But the enhanced price of the manufactured article, owing to the high price of wages and raw material, cannot be so easily adjusted, because consumers and buyers will not become readily accustomed to rapid advance in prices, and, therefore, their purchases will fall off.

We think that the manufacturers of this country are passing through a very critical stage, because, if they do procure sufficient men to run their plants to full extent, owing to conditions above mentioned, their profits will be small, or if they run with reduced staffs their overhead expenses will be nearly as great as when running at full capacity, so that we find ourselves between the devil and the deep sea. Still, we think that this state of things will not last very long, and we look to a time of great prosperity in the very near future, when the cost of production and sale price of the article will be intelligently and properly adjusted.

Heretofore few of us have taken into account the small proportion of people engaged in the production of the things we require for our everyday comforts, luxuries, etc. So that a great many people were receiving the best that the country could produce, and giving very little in return for what they received. They are enabled to do this by the unjust and uneconomic manipulation of the finances or circulating medium of the country, by which they can take advantage of the necessities of the people and get something for nothing. The war has taught us this in a very forcible manner, for we find, notwithstanding the large number of men that have been drawn from the community, many of whom were producers, and must still be supplied with food and clothing of the most expensive kind, also the enormous amount of labor expended for the manufacture of munitions, the supply of things we require for everyday use is not behind the demands for same.

We think with Bellamy, in his "Looking Backwards," that if every person did his share of the work under economical and intelligent management, three or four hours a day would be sufficient for each worker to supply our wants. To sum up, we do not think that there will be much change in the manufacturing conditions in this country in 1917, except the necessary advance in prices.

The Thompson Kanuck Kitchen Cabinet Co., Ltd.,
Belleville, Ont.

* * *

It is rather hard to make any definite forecast as to what will happen in 1917. At the present time we are very busy with men that we can procure. Wages are higher than ordinarily, and the prices of raw materials seem to be jumping ahead with leaps and bounds, with no prospects of steadying down, in fact the available raw materials seem to be fast disappearing.

The Schultz Bros. Company, Ltd.,
Brantford, Ont.

* * *

The general condition of trade in Nova Scotia is good. In the agricultural districts there have been good crops and the farmers are realizing the largest prices in years. Those engaged in the fishing industry have on the whole been very successful. In one company alone it is estimated that the increased value will amount to $300,000. This does not mean the value of the total catch, but the increased value over former years, and the best of it is that the money is divided amongst a large number of fishermen who work on shares with the owners of the vessels.

Our lumber industry was not quite so good as we hoped on account of the difficulties of transportation, particularly by water. Good prices are being obtained, however, and just now the prospects are very bright and a good season is confidently expected, providing, of course, the weather conditions are not too unfavorable.

Our mines are handicapped by shortage of labor, but their product commands very high prices. Manufacturing centres are all busy, and in centres like New Glasgow and Sydney, where there are large steel industries, there is an overflow of prosperity, large amounts being paid to skilled workmen who are buying more liberally than ever before.

In Halifax, the capital of Nova Scotia, trade has been especially good for several years. While it is not a great manufacturing city, a large amount of shipping centres there, and this has greatly increased since war broke out. Large numbers of troops are stationed there, and disbursements on this account alone must reach a large figure.

In regard to the furniture industry, the outlook is much brighter than it was this time last year. During the summer months business improved and has been well maintained up to the time of writing.

From present indications it would appear that there will be an active demand for furniture throughout the spring, and possibly the summer months, but in these uncertain times

it is useless to look too far ahead. The prineipal difficulty will be the obtaining of supplies, which, we believe, will be more difficult next year than in the year just closing. We refer particularly to hardware and mirror plates.

The inereasing cost of manufacturing and the very large prices of raw materials will no doubt make it imperative that higher prices be obtained by the manufacturers. The retailer will no doubt be placed in a difficult position by the ever-increasing cost he has to pay for his goods. He has the consolation of knowing, however, that his old stoek is worth a good deal more than he paid for it. We believe that manufaeturers should—and no doubt will—use every means in their power to co-operate with the retailer in this unpreeedented situation.

On the whole, then, we must say that the outlook for next year in this province is exceedingly promising.

Windsor Furniture Company, Limited,
Windsor, N.S.

* * *

We hesitate to venture an opinion as to the outlook for 1917 bèeause of the unusual eonditions which now prevail. The lumber business depends in some respects on the eonditions in other lines of trade. Our principal source of trade lies along three lines, namely, the supply of material for ordinary building purposes in the city, the replenishing of stocks of the various factories, and the supply of material to farmers in the neighboring country district. With regard to the former there is at present a good demand for houses in the class which run at from $15 to $25 per month. The demand is brisk at the present time, because many outsiders have come to the city to engage in the manufacture of munitions. Should peace ensue in the near future quite a number will remove from the city, and this will eut out the demand for this class of houses, and, of course, will have a deterrent effect on building. The manufacturers are at present buying fair quantities of lumber for additions to their premises and repairs, and to keep up their stocks, which are constantly needing to be replenished. The light crop which prevailed in this district has caused most of the farmers to put aside any idea of building for the present time. The rather heavy advance during the past month or two in all classes of building material will also tend to make investors wait for a more favorable time to build. If the war eontinues, we feel sure there will be a fair demand for lumber, even at the present high prices, but should peace come in the near future there will no doubt be a greater or less upheaval in all lines of business for the time being, but it appears to us that this cannot mean any great fall in the priees of lumber, as the stocks are low and there is not a very large eut being taken out this season, so that it will be a matter of at least a year or two before lumber prices are likely to fall to their former level. On the whole we are of the opinion that in this section building will not be very brisk during the coming year.

D. Aitchison & Company,
Hamilton, Ont.

Difficulties Experienced in Manufacturing Under Government Contracts

Among the many worries attendant on the production by woodworking plants of goods under government contracts, one which takes high rank is that of inspection. It is apparent that there is ample room for divergent views as to whether the goods are up to specification, and that much depends, for one thing, upon the competency of the inspectors. A man with very little or no knowledge of the productions to be passed on may cause a large amount of trouble and loss to the manufacturer, and even where capable men are employed, there is no guarantee that unfair rejections may not take place. One inspector may be quite arbitrary in his decisions and will give no information as to the nature of the alleged defects, while another man will look not only to the strict letter of the specifications, but also to the spirit of the document.

It depends upon whether an inspector is broad-minded in the sense of judging the goods as a whole. Inspection is, of course, necessary, but a man may be super-critical and object to things which are not essential to the strength or right appearance of the goods. Reputable firms, who are endeavoring to produce a satisfactory article, will not object to the rejection of goods which are manifestly defective. Their business is to make, say, boxes, which are up to contract, as rejection means the waste of not only valuable lumber, but also of the still more valuable labor which has been put into the boxes, and the profit is so narrow that a firm making inferior goods stands to lose heavily should the percentage of rejections be high.

Some makers of shell boxes have also suffered because of the decisions of the Imperial Munitions Board as to deliveries. At one time they have been asked to rush orders, and have put on day and night shifts; then without warning, orders will come for the practical cessation of deliveries, which means the almost entire shutting down of the plant, with, of course, a certain amount of overhead expense going on. Recently a very large number of orders were given out and these were in course of execution, when instructions were sent out declining to take further deliveries for some time.

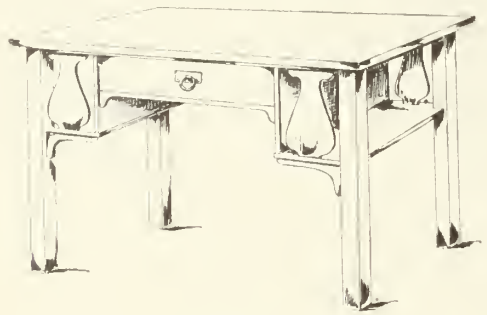
Our readers need not be told that this involves a large expenditure to some firms, with the possible loss of workmen, who can now find profitable employment, and are not likely to stand idle to suit the convenience of the Purchasing Board. These workmen are difficult to replace in the present condition of the labor market. Probably the Board may have good reasons for declining deliveries—it is no secret that munitions plants are behind with their orders—but to the woodworking manufacturers who are relying solely on government work, it spells monetary loss and capital tied up. Particularly is this the case where, in anticipation of a long run of work, orders have been placed for lumber and hardware, amounting in one case we know of to many thousands of dollars. It is complained that the Imperial Munitions Board give practically no notice of their intention to stop deliveries, and that they placed large orders when there were thousands of boxes to be made on old contracts. This was followed by instructions to stop manufacturing, placing firms in a very unsatisfactory position, not knowing when they will be able to re-commence operations. In some instances, we understand, manufacturers have welcomed the decision of the Board to discontinue, as it gives them an opportunity to fill orders for commercial boxes.

Practical Methods in the Furniture Factory

Design, Rod-making and Stock-billing—Fourth of a Series of Articles on Modern Factory Practice—Marking Band Saw Patterns from Drawings

By W. J. Beattie

To illustrate this article I have selected a library table, as its simplicity of construction and design makes the article more easily understood. The table is of the Art Craft class, which is simply a modern adaptation of the mission style. There is no beauty in mission furniture, and the desire for "more line" has evolved the style called Art Craft, which appeals much



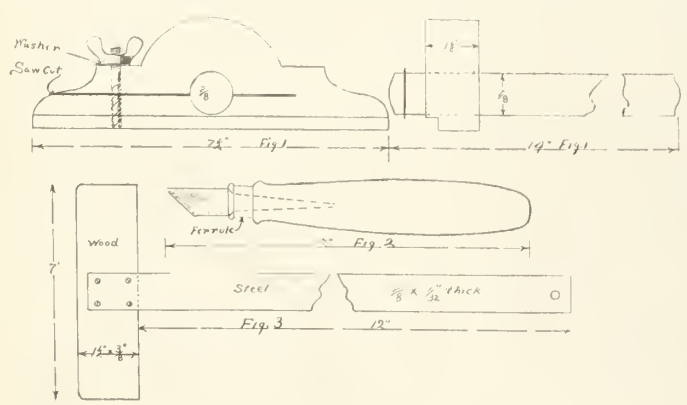
Sketch of table of which rod is to be made.

more to the average person than the straight, severe, heavy appearance of the mission.

The art craft table shown is of the simplest type, and its construction is quite apparent to a practical observer. The prominent corners are rounded off, thus producing a soft and pleasing appearance. These have a decided advantage over sharp, square corners, as the latter are sure to be marred and worn off in general use. It is not necessary to make a detailed drawing of such a piece; the sketch is all that is necessary. The size of the top being given, and the standard height being 30 inches, a rod can be made without further work.

The Rod.

The word "rod" has been used to designate the details that are laid out on a piece of ⅜-inch basswood. This is usually 84 inches long by 10 or 12 inches wide, sanded on each side and given a couple of coats of thin white shellac. The "rod" must be straightedged and the edges must be parallel to each other, so that work can be done from either edge. The shellac coats, which are sanded smooth, must be sufficient to fill the grain of the wood so that ink will dry on the surface and not run into the wood and produce a blurred and ragged job. The word "rod" is a survival of the name given



Tools for making rods.

to ⅞-inch square strips that were used years ago, on which the lengths and widths of the stock in a job were laid out, with as much of the construction detail as possible. Necessarily they were not nearly so comprehensive as the modern method. The name "rod" still does service, though the resemblance to a rod is only imaginary.

Necessary Equipment.

The tools necessary for making a perfect job of rod-making are a gauge, made entirely of wood except the iron clamp screw and the brad driven through the "beam," which is sharpened to a point, and marks the lines that run parallel to the edges of the rod. Fig. 2 is the cross line marker, and is simply the butt end of a small worn out flat file, sharpened from each side and inserted into a turned wooden handle. Fig. 3 is a small square, having a steel blade and wood cross head. This will guide No. 2 for all the right-angle lines. Fig. 3 can be made with wood blade, though it is not so satisfactory, as, in a moment of weakness, the edge of No. 2 may cut into the wood blade and thus necessitate re-straightening the edge. Make the one that you think will fill the bill best.

A bottle of Higgins' drawing ink, a pen, and a pencil having a point sharpened at a short bevel complete the equipment. The pencil is used to "spot" the lines where they terminate by a slight "punch" mark.

As the full-size dimensions of the tools are given on the drawings, they need very little explanation. The "pinch" screw used is simply a small hanger bolt having a wing nut and washer. The point of the bolt can be filed off. The saw cut gives the necessary room for the screw to pinch the head tightly on the beam. A maple head and a walnut beam make a nice gauge. These sizes are from the same tools that the writer has used in preference to others. They have been found the best by experience. A four-foot rule is also to be desired.

Making the Rod.

The illustration of the appearance of the rod is necessarily not exactly correct, as the drawing shows inked lines where the lines of the gauge and knife would show in the actual work, with the obvious exceptions. The first, or obverse side is the one on which to start. Draw the centre "scratch" line and work from that to the ends. The plan across the end of the table is done at the same time, as many settings of the gauge are frequently the same, as is easily seen.

One of the principal things to be particular about in the making of a rod is to have the shoulder lengths correct. The mere length of a tenon is not vital to the sixteenth of an inch. The reverse side of the rod is shown, and there is practically nothing left, so far as information is concerned, as to the construction and patterns required. All screws are shown, with the exception of some that hold the top on, and these would appear on a full-sized rod.

The readers will readily understand that it is next to impossible to show such small things on a small drawing that has to be still further reduced to the size of a magazine page.

No. 5 on the end plan shows the checking out of the

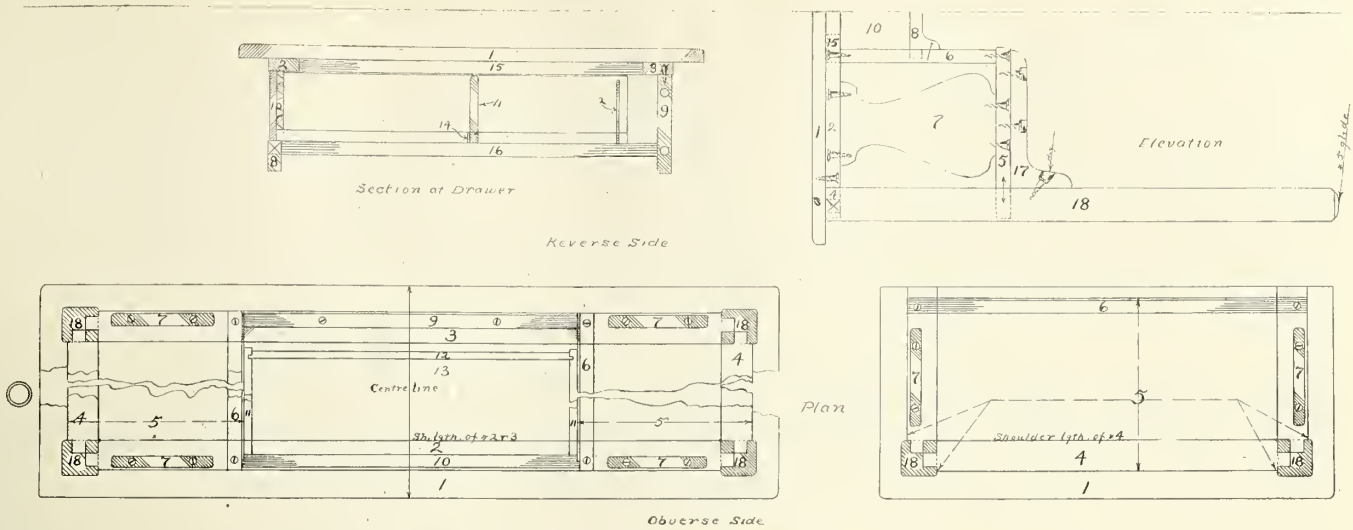


Illustration showing how to lay out a rod. Details on both sides are shown.

shelves, and broken ink lines are used in such cases. In some factories the rods are works of mechanical art, gotten out in splendid shape, and have a sketch or blue print of the article securely pasted on to them, as an additional help to the workmen.

The Stock Bill.

The accompanying stock bill is made out simultaneously with the making of the rod, and the measurements of one are thus checked against the other. In this way the sizes on the manufacturing tags are above suspicion. The stock bill is 14 inches by 10½ inches, of moderately stiff covered pasteboard, having a smooth, hard surface, ruled as shown, printed on both sides, and having an eyelet hole in the top end. These stock bills cost from $5 to $7 per hundred. As a matter of economy, it is a good plan to get a quantity of the thin paper copies as well. These can be used for special or sample jobs, the cost being practically nil, as the same "set up" at the printer's will do the both.

The stiff stock bill is the one for stock work, and after being completed it can be coated with white shellac, except the "check off" column, and is thus kept clean and legible. The methods of writing stock bills differ very little. Some prefer to write all the quartered oak items first, then the plain oak, etc.

The writer has invariably written them as the one shown, as being less liable to overlook any items of material. This is not so apparent in a bill of only eighteen numbers, but when it is four times that many it becomes a more debatable point. The stock bill presented contains a footnote of the net material, hardware, etc., required, which is a handy reference when making out the cost card. It does not add materially to the labor at the time, as the requirements are fresh in the mind, and the trimmings, etc., have been decided on.

The advantage of rods over drawings for shop use are so many and apparent that it seems a waste of time to present them, but there are still factories that don't know what rods are. It is not over a year and a half ago that the writer was told by one of the fairly large factory owners that he (the owner) was not yet convinced that the rod idea was the better way—in fact, he had only a hazy idea of what was meant by a rod, as his subsequent conversation showed. How long will a drawing last in factory use? It becomes tattered and disfigured in a short time, no matter how much veneer tape and care has been used to make it harm-proof. The rod is less liable to be affected by weather or atmospheric changes and is practically indestructible. The machined pieces can be laid on it and the sizes verified exactly, which is next to impossible with a drawing.

A few more remarks on the rod before closing. It will be seen that there is a ½-inch or ⅝-inch hole bored through the one end. On the opposite or lower end the number and name of the article is printed in large, legible letters. As the rods are hung generally at the most convenient point in the machine room, it is easy to find the one desired. It is essential to a complete job to coat the finished rod with shellac, as this keeps it clean and bright. Keeping each kind of rods by themselves will, of course, suggest itself as being

STOCK BILL

CAT NO. 299 ARTICLE Lib. Table MAT. Q. Oak DATE Jan 1917

ALLIED FURNITURE CO., LIMITED

Bill No.	No. Reqd.	Description	Wood	Length	Width	Thick.	Remarks	Quantity Material	Check off
1	1	Top	Q.O.	42	26	¾	Rd Corners Mould #71 Sand 1 Side & 4 Edges	1092	
2	1	Front top Str.	O.	37	1¾	"	Sand 1 edge ⅝ from Top Bore Screws	65	
3	1	Back "	"	"	"	"	For #1 & 7 & 9	65	
4	2	Top End	"	21	"	"	" " " For #1 & 7 & 9	74	
5	2	Shelves	Q.O.	23	10	"	Check 2 Corners Rad 1 1/8 Sand 1 Side & 2 Edges Bore Scs #1 & 7	460	
6	2	Divisions	"	"	9	"	Mortise for #4 Dl for #9 In Parts Sand 2 Sides & 2 Ends	414	
7	4	Shelf Stiles	"	9	6¼	⅝	B Saw Sand 2 Sides Mould 1 Sand 2 Edges	228	
8	1	Dr. Stretchers	"	20¾	2	¾	¼ x ¼ B. BS Sand Face Mould lower Face Corner	41	
9	1	Bk Rail	"	19¾	6	"	Dl for #6 BS Sand Face Mould lower Face Corners as #8	116	
10	1	Dr. Front	"	"	4	"	Groove Check Dovetail Bore for #1119 pull Sand Face	77	
11	2	" Sides	O.	20	"	7/16	Groove Mould Dovetail Sand	160	
12	1	" Back	3 Ply Q.O. Side	18¾	3¼	⅜	Sand 1 Side ⅛ Bead	30	
13	1	Belt	"	"	20	7/16	"	370	
14	2	" Side Strips	O.	20	⅜	⅛	Glue to Dr Sides in Bench Room		
15	2	" Over Bearers	Birch	19¾	1¾	¾	Bore & nails Goon top of #6	60	
16	2	" Bearers	"	21¾	¾	"	" " "	43	
17	4	Shelf Brkts	Q.O.	10	4	"	2 B.S. Mould 1 Corner in Pairs Sand Bore 3 Screws	80	
18	4	Legs	O.	29¼	2	2	Sand 4 Sides Mould 3 Corners Dl for #5 Mortise for #2, 3 & 4	480	
							17.42 of Q.O. Net		
							2.24 " P.O. "		
							3.34 " " (Dimension)		
							2.57 " 3 Ply " (Q.O. 1 Side)		
							71 Maple "		
							8 - 2¼ x ⅜ Dowels		
							48 - 1½ #10 F.H. Screws		
							1 #1119 Dr Handle Hahn Brass Co		
							4 #5 Glides - Onward Mfg Co		

Convenient type of stock bill.

handy. Upright pigeon holes for the various stock bills is also a desirable adjunct.

Band Saw Patterns.

The few band saw patterns of the table are easily made, and can be drawn directly on the thin basswood used for such purposes. The same pattern will do for items No. 8 and 9.

To take a pattern from a drawing, the best way is to use the ordinary carbon paper, which transfers the pattern to the wood accurately, providing the line of the drawing is faithfully followed by the pencil. It is nearly always necessary to look carefully at the patterns after they have been band sawed, to see that the curves are properly sawn, as band sawyers that have trained eyes for curves, etc., are much scarcer than they were previous to August, 1914. The most satisfactory wood for band saw patterns is thin basswood; it is light and reasonably tough, and stays in shape well.

More along the lines of patterns will be in order in a future article.

Moulder an Important Factor in Production

Practical Hints for the Operator—Making Knives from Blanks and Tempering Them—Proper Balancing of Cutters Essential

By S. E. S.

There are so many factors that the regular and efficient output of a modern planing mill depends on that to discuss all of them in detail would require a lifetime. Further, it would require many pages of our up-to-date woodworking journals.

One of the factors which I will attempt to discuss herewith is the "sticker." Many a planing mill is today struggling along trying to get a satisfactory output, and perhaps the manager is still wondering what is wrong. Let the employer ask himself one or all of these three questions: Are my machines up to date? Are the men running them efficiently? Is their work systematized?

As the moulder is one of the most important factors in production, I shall address the industrious improver who has a good machine, a cool head, and lots of ambition—the young man who improves by his mistakes and never gives up.

The making of a good sticker man is the fellow who knows his machine from top to bottom, just where every adjustment is made and where to make it. If you are desirous of becoming a good stickerman you will not need the aid of an expert to show you where to get away from lost motion. You study your machine and by and by you are able, through practice, to detect the slightest sound and locate the trouble. Now, I would not have readers run away with the idea that they must be forever tinkering; too often a good machine has been ruined by irresponsible workmen.

A good operator has little use for any tools except a head wrench and his own head. As each machine has its own peculiarities and "cranky" ways, he will learn them and treat them accordingly. He will be as proud of a "big run," and that done well, as his employer.

He should acquire a system in everything; first, a system in oiling. Always start to oil your machine at the same place, say, at the countershaft, going from there to the feed rollers on the outside, and then the cylinders in order, coming back on the inside of the machine, catching every part where there is wear, and finally the loose pulley. In doing this you are not liable to forget one single place, and thus avoid a hot bearing or a bound gearing, etc.

Your machine should be kept clean. Clean it thoroughly at least once a week, and don't neglect it. How much nicer it is to walk up to a clean machine on Monday morning! Why, you will feel better, because your surroundings are better, brighter, etc., and it all helps in your work nowadays.

The next system to acquire is that of having a place for everything and everything in its place. Did you, as an operator, ever stop to think how much time is lost to your employer each day because you have not a regular place for your tools? Have a particular place for each wrench, preferably on a board hanging handy to you as you are "setting," just inside of the feed rolls. Have the wrenches firmly fastened by means of a hole bored in each one and a round head screw screwed into the board. Then each time you make a "set" you can see at a glance if your wrenches are in place. If they are, you know you have not left one in the machine.

It may seem insignificant to some readers to place so much stress on such small matters, but the things to be done the oftenest must be done the quickest, and a lost wrench or a wrong one will cause more lost motion than almost anything else.

Another system I would have the industrious apprentice practice is the proper and regular way of placing knives away. Build yourself a large, roomy cupboard if you have not got one now. A few drawers are handy to keep sample moulds, templates, and extra bolts, etc., in. Have a certain place for each set of knives and put them back there when you are through using them. By following this rule there is only two places for any knife—either you have it in the cupboard or on the machine.

Now the making and tempering of knives, to discuss properly, would require considerably more space than I have at my disposal. Each is an operation in itself.

Making Knives.—In taking up this branch of the subject we will ignore the process of making blank knives, as these are always procurable from any of the knife-making firms on short notice. So when we say "knife-making" I refer only to the grinding of the slotted blank to suit the desired mould.

After some thought you will readily see that a knife made the same shape as the face of the mould would not make that mould on account of being on an angle when it does the cutting, for as the knife swings round, the long points strike first and finish cutting first before the shorter parts of the knife come into action. This complicates the matter so that unless you have a scale you will very often do a lot of cutting and trying if you attempt to grind by guess.

Now, let the reader take the diameter of the cylinder head and add to this twice the projection of the straight knives. Lay this out on a piece of paper or clean board, and scribe the cutting circle of the straight knife. Draw a line through centre of plan, straight

past cutting edge of straight knife. This gives the depth of the mould.

To find out the length of the knife required to cut this mould draw circles intersecting this line, one-eighth inch apart. Where the circle intersects with a line drawn in line with face of knife or side of cylinder will be found the length to grind each part of the knife to cut a mould perfect on first trial.

Should the aforementioned directions not prove clear enough to the reader, please send the editor of the "Canadian Woodworker" the size of your cylinder and a sketch of the mould you desire to make and the writer will be glad to prepare a plan for you.

The knives being made, the next move is to have them perfectly tempered. There is as much in heating a knife as in tempering. Some steel will stand lots more heat than others. Some will not stand a red heat, while others will stand almost white heat. One must become acquainted with the various kinds of steel to know how to get best results. This subject leads me to say that not enough attention is paid to the quality of the cutters, which are in the majority of cases made of steel-faced blanks, and if the cut of the mould be any depth they will tremble and bend, producing poor work. All, or nearly all, moulding cutters should be of solid steel. Then results in tempering and producing first-class work will be satisfactory.

Before closing these few remarks, a further suggestion to the apprentice may not be out of place. After making your knives, see that they are properly ground to balance before tempering. Poor temper in knives is very apt to cause a poor temper in the man. I like to heat my knives for about a half-inch back to a nice cherry red. Then dip into bucket of water with about half an inch of machine oil on top. This will prevent temper cracks. Be careful to dip only, say, an inch deep into the oil or water, keeping rest of knife hot to draw back to required color. A new file is a good thing to try on the knives. When it begins to bite, immediately place the entire knife in the bucket.

In a later issue of the "Canadian Woodworker" I will endeavor to give some information on running moulding, flooring, and special detail work.

Medical Supervision of Employes

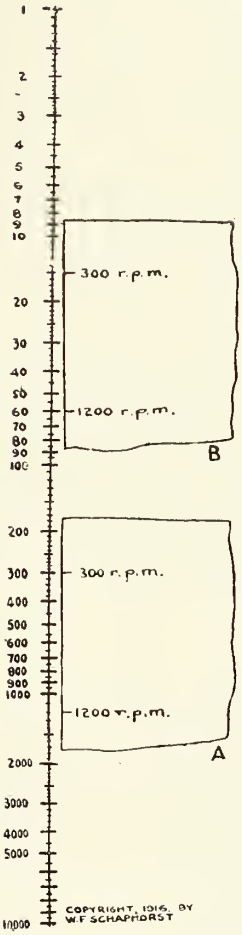
Health is the workingman's capital, his stock in trade. Without health his earning capacity is limited, and those dependent on him suffer as well as he. The workingman has a right to demand that he be not required to work beside men who are diseased or mentally deranged. All candidates for employment and all men already employed should be examined in order that those physically or mentally defective may be detected and given medical attention. Moreover, a system of medical supervision is necessary in order to prevent the introduction and spread of infectious or contagious diseases. Experienced, hard-working, and valuable employes may not be working at their full capacity because of some defect of which they are unaware. Should such conditions be brought to light and remedied, these men will be restored to full efficiency.

Again, a progressive disease may be affecting a person so that his working period is being rapidly shortened. With a system of physical examination his condition is discovered, treatment is instituted at an earlier date, and relief made more certain. An efficient force cannot be maintained with constant substitution of new men for old, especially if the duties of the workers are in sequence, for the efficiency of the whole force will be lowered to meet the ability of the new and inexperienced men.

Aside from purely business consideration, medical supervision has a humanitarian aspect. Few abnormal conditions resulting from harmful industrial environment are themselves fatal; they are underminers. The most common terminal disease is tuberculosis. Out of 140 classified occupations tuberculosis is the leading cause of death in 110. Many diseases, if discovered in their incipiency, are amenable to treatment. The affected person is usually unaware of the abnormal conditions.—J. A. Watkins, passed assistant surgeon, United States Public Health Service.

Pulley Computations

This simple little chart does away with formulas for making pulley computations. It will be found to be exceedingly quick. Just slide the slip of paper from position A to position B and the problem is immediately solved.



For example, a motor running 1,200 r.p.m. is to drive a line shaft at 300 r.p.m. What sizes of pulleys should be used?

On the slip of paper in position A make marks opposite the 300 and the 1,200 as I have done. That's all you need do; but if you want to write down "300 r.p.m." and "1,200 r.p.m." also, all right—it doesn't make any difference.

Then slide the slip of paper up to wherever you want it. Position B shows that pulleys 15 inches and 60 inches in diameter respectively will do the work very well.

Of course, if those diameters are considered too large, just shove the slip a little higher and choose the best diameters. No matter where the slip is placed, the ratio is always correct—no figuring is necessary.

The chart shown here also lends itself readily to the solution of such a problem as: Knowing the pulley diameters, and knowing the speed of one of the pulleys, what is the speed of the other pulley? Try it. It is so easy it needn't be explained in print. You can "guess it" in a minute.—W. F. Schaphorst, in "Mill Supplies."

See the Doctor Promptly

While working in the mill a laborer scratched his right hand on the end of a wire. The skin was cut a little, but he paid no attention to it, and kept on working. For several days the hand pained him slightly, but, thinking it would soon be all right, he continued to work. On the fourth day his hand was swollen, and the foreman, noticing it, sent him to the doctor. Upon examination it was found he had a bad case of blood poisoning. He had gone to the doctor too late, and in order to save his life the hand had to be amputated. Remember, when injured, no matter how slightly, always report it to your foreman and go to see the doctor. This is one of the rules of the company, and, if obeyed, workmen will not be bothered with the much-dreaded blood poison.—Bulletin United States Steel Corporation.

Construction of Verandahs and Sun Rooms

Suggestions for the Millman—Well Proportioned Columns Give Attractive Appearance—Illustrations Show Popular Types of Sash

By Kenneth McGilvray

In this era of outdoor living in summer the verandah is one of the most important parts of the house, and should be easily accessible from the main living rooms. Some think the verandah is a purely American institution, but it is really the old time porch which has been used for centuries, call them what we may, piazza, portico, loggia, verandah, or any other name.

Some may think that these belong to the architect. Although that may be so in theory, in practice it is different, as in 75 per cent. of the porches or verandahs built on the medium or smaller class house, the millman has had all to do with them, so that it is a subject that deserves consideration.

Timber used as an exterior feature of a building requires more consideration perhaps than any other timber used in a building on account of its exposed situation and the properties required of it. A verandah usually has to provide all the requirements of an outdoor sitting room in fair weather, and also act as a protection to the side of the house on which it is built during heavy rain storms.

Verandah flooring should be at least 1¼ inches thick, tongued and grooved, and laid with white lead which has been dissolved in raw linseed oil to a pasty consistency. A good material for these floors is clear dry white pine, heart stock, and free from all imperfections. Our Canadian hardwood flooring does not

Fig. 1

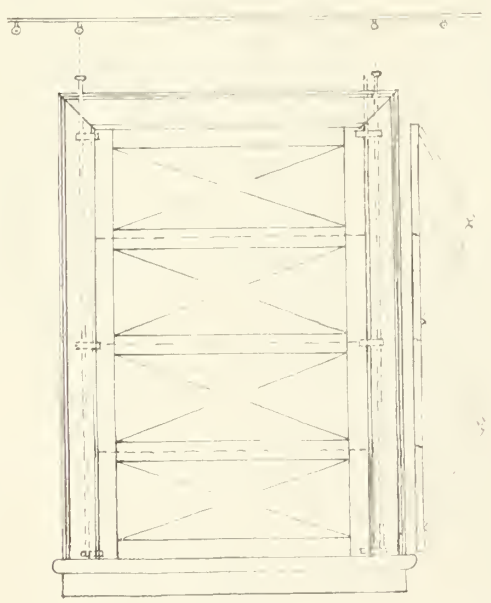


Fig. 2

Figs. 1 and 2—An ingenious arrangement for porch sashes.

stand the changing weather conditions to which a verandah floor is subjected, and should not be used for such floors.

The roof should pitch about 4 inches to the foot. The ceiling may be formed of narrow strips of pine or hardwood, usually grooved and tongued.

The porch or verandah columns are perhaps the principal means of making it attractive. Many types of columns are pleasing and many practical, but none more so than well designed Greek columns.

It was formerly almost impossible to get a nice Greek style of column, well proportioned, from the usual mill stock, but many of the makers in almost any district now stock really well made columns, patterned along the best Greek lines. The Greek Doric and Tuscan columns are especially good for houses, as they are the plainest of the Greek styles, and the simple, round capitals may be turned out of the solid wood, whereas in the Ionic and Corinthian styles more ornate capitals must be made, and on columns of moderate cost they must be of paper-mache or composition.

If the columns are to remain their natural color and have merely a coat of oil or spar varnish, either cypress or Georgia pine will prove satisfactory. If, on the contrary, the posts are to be painted, they had better be of white pine or yellow pine.

The cornices on first-storey porch roofs are usually lighter and more dainty than main roof cornices, as they are nearer the level of the eye. They should be smaller so as not to appear too coarse. This is a point that is seldom remembered by the millman, as there are many cases where an otherwise good looking house is spoiled with the gross size of cornices used on parts near the ground. They should, however, be similar in pattern to the main cornices. The mouldings should all be related to both cornices, although they need not be identical in pattern.

There are several recognized rules and tables for getting the sizes of pedestals, columns, cornices, etc., of the different orders in almost all architectural dictionaries. These should be made more use of by the millman in the future than has been done in the past.

Another common form of porch is the small portico at the front door of the house, with stationary seats built on either side. It provides shelter for the door without darkening any of the windows, and makes a place large enough for several people to sit comfortably. These porticos often have a flat roof, so that they can be used from the second floor. They also have a small balustrade railing about 2 feet to 2 feet 3 inches in height.

Overhang trellis or pergola porches or loggias should not have wood floors, but should be paved with cement, tile, bricks, or other non-absorbent material, owing to their exposure to the weather.

If a porch is to be used as a conservatory or sunroom in winter it is much easier and practical if there is a solid covered wall up to the height of about three feet or over. When there is no such wall, there must be sections of solid boarding and sills that can be screwed in place on the approach of cold weather. The sashes are fitted in above this.

Sashes in sun rooms should not be too large, not over 5 feet or 5 feet 6 inches by 2 ft. 6 in. or 3 feet. It is better to have a number of small ones than a few that are too large to handle conveniently when putting them up or taking them down. A large, heavy sash with the weight of the glass is also liable to sag, es-

pecially if hinged, and when being opened or shut its sweep takes up too much room.

Hinged sashes are usually hung to open vertically, like casement windows. They can, however, be hinged and hung to open horizontally, and in this way the whole space between pillars can be opened to the air.

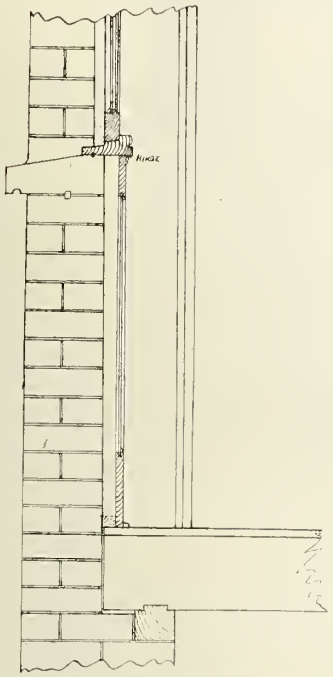


Fig. 3—Hung sash for sunroom in brick house.

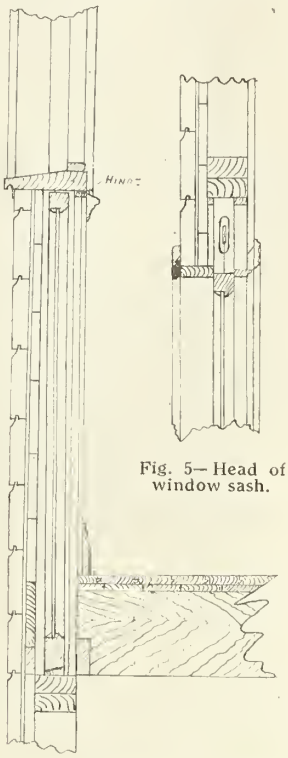


Fig. 4—Hung sash for frame house.

Fig. 5—Head of window sash.

This arrangement is particularly useful where the sashes are left in place the year round. Another very good system of hung sashes (that is, with cord and weights) which has of late come into vogue over the border, has the sash hung so as to go right down to the floor, clear under the sill, the pulley stiles being continued right down. The sill in this case is hinged, and the sash is allowed to push up about 3 inches higher than usual to allow the sill to swing up clear. The sash is then pushed down under the sill level and the sill replaced.

One objection to this system is the open joint in the sill which may allow water to get underneath. There are, however, several methods of overcoming this to a great extent. One simple way is to have a piece of zinc or galvanized iron fixed to the window frame and bent over the joint. This type of window has been used in the deck houses of steamers for years, but they have a tin receptacle at the bottom of the space left for the sash with a small pipe leading the water to the outside.

Another idea something along the same line as the above has just been installed in the new infirmary at the Mountain Sanatorium, Hamilton, Ont. (opened December 4th, 1916). The window ideas there were borrowed from the Metropolitan Life Insurance Sanatorium at Mount McGregor, Saratoga Springs.

Each ward has its own outside sleeping porch fitted with windows in two halves, the two sashes of which slide down into the wall below the sill. Louvres or venetian shutters also protect these windows. These will no doubt be found to be a great improvement, as I remember fitting up very large sliding sashes on the sun room of the children's building at this Sanatorium when it was first built, some six or seven years ago.

Another simple but ingenious idea for porch sashes which is being advocated in the United States has narrow sections of sash hinged together to fold like a screen. These are hinged to a plate under the ceiling and by means of cord and pulleys at the ceiling are pulled up out of harm's way when not in use. These sashes were fully explained in "Country Life in America" some time ago. (See Figs. 1 and 2).

The floors of sleeping porches, which are usually upstairs, are no doubt a source of no small trouble, owing to rain and snow beating in when the windows are open, but if canvas screens are provided which can be hooked at sides and sill, very little water will get on to the floor.

Many of the floors are now being covered with canvas or sailcloth, and well painted over the same as the upper decks of many river steamers. No doubt the shipbuilders can supply a good many ideas along the waterproofing line that would be worth adopting by the millman, especially in skylights, lantern roofs, etc.

Fig. 3 shows hung sash for sun room for a solid brick house. The sash is shown here closed. The brick facing is often only half brick or 4½ inches thick, in which case the window frame would be constructed the same, only it would be further out to the face of the building. The pocket for the weights would be best down near the floor if possible.

Fig. 4 shows a sash of the same kind but for a room covered outside with clapboards or novelty siding. The sash is here shown down or open and let down the full depth of floor joists, which allows a bigger window space. The sash could be double hung the same way.

Fig. 5 shows the head of window sash. Note the position of pulley which allows the sash to be pushed up far enough to let the sill swing clear when opening.

Manufacture of Berry Boxes

By D. C. Redman

The foreman of the National Lumber Company box and veneer factory, at Hoquiam, Wash., recently showed the writer through his department, and among other things explained the manufacture of that familiar but useful article, the soft fruit or berry box shown in Fig. 3.

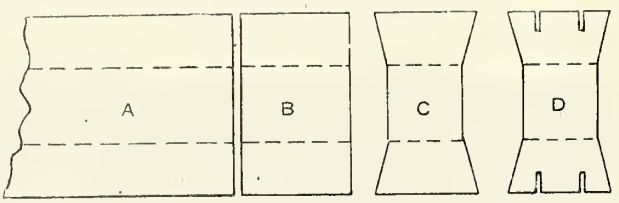


FIG. 1

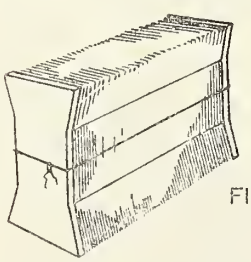


FIG. 2

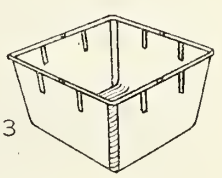


FIG. 3

How berry boxes are made.

Without any preparation whatever, outside of lying in the log pond, the sawed sections of spruce logs are

mounted in a veneer lathe and peeled into sheets 1/28 in. thick. Stationary knives and revolving spur wheels mounted on the lathe cut and score the sheets as they are peeled (see A, Fig. 1). At the clipper they are cut into about 8 in. widths, B. Next in order is the blanker, C, with its stationary knives, through which the sheets are forced in bunches of two dozen or so.

They are then packed into bundles like Fig. 2 and dropped between a pair of conveyor chains connected with cross-bars, which carry the bundles under a pressure-shoe directly over two rip saws. These cut the ventilating slits, D. After a light air-drying, the bundles are taken to the assembling benches, where girls fold the blanks into shape and crimp the narrow bands of tin around the upper edges. This is all piecework; 1,600 boxes per day is the average of the best box-makers. The finished boxes are nested and packed for shipment.—"Veneers."

Women Making Shell Boxes in England

Factory Organized so that Each Worker Feeds the Other—Illustrations Show Girls Operating Woodworking Machines

Those of our readers who are engaged in the manufacture of shell boxes and are finding it exceedingly difficult to secure labor will undoubtedly be interested to learn what is being done by employers in England to fill the places of the men called up for military service. The complete manufacture of ammunition boxes is being handled by female labor. We reproduce below some photographs and extracts from an article published in a recent issue of "The Cabinet Maker," London, England, showing some of the operations being performed by women and explaining in part the order of procedure:

"Two years ago neither masters nor men believed that women could be successfully employed in the manufacture of woodwork, and more especially in the manipulation of woodworking machinery. We remember being present at a meeting at the Home Office between employers and the unions when the practicability of employing female labor in woodworking factories was denied by half-a-dozen speakers on each side of the table. From the date of that conference we have frequently urged manufacturers to train women in order to keep their factories running, after practically all the men have been withdrawn for military service. A great deal has been done in this direction but we doubt if, even at this date, our countrymen are awake (to use Sir William Robertson's phrase) to the urgent necessity of training women. If the war is prolonged, we are bound to encounter ever increasing difficulties with regard to labor, and with a view to the conversion of those of our readers who are still sceptical about women as woodworking machinists, we are able to publish some photographs, showing women and young girls engaged as woodworking machinists in the manufacture of ammunition boxes. Where these photographs were taken the factory has been so organized that one girl feeds the other with work, so that the speed of the first girl and machine is as near as possible the speed of all the following operations. The timber for the ammunition boxes, already cross-cut and cut to width, is delivered to this department and placed close beside the machine, so that it is not necessary for the operator to leave her machine or wait for material. Many of our readers will recognize the now well-known 18-pounder box parts which are shown in the machines in our illustrations. Figure 1 shows a girl operating a multiple spindle dovetailing machine, preparing the sides and ends of the box, after which the slides for the shell-rests are nailed on, which is done by dropping the fillets through openings in a special gig, and after the fillets have been nailed on, and the gig lifted off, the slides are exactly in their proper position. (This operation is shown in Fig. 4).

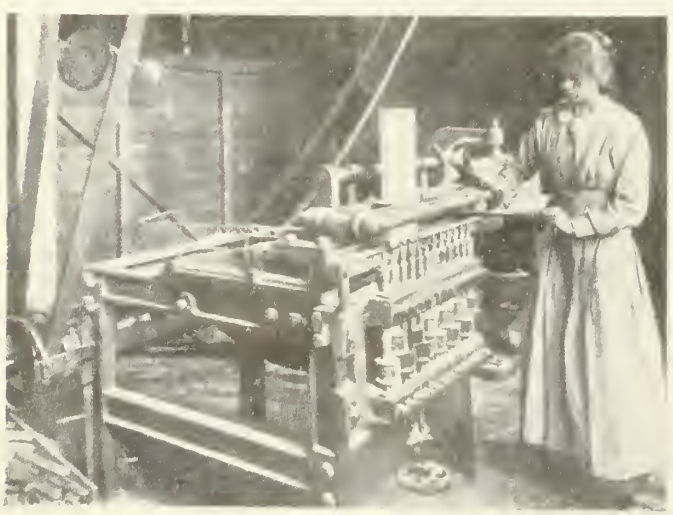


Fig. 1—Operating a dovetailing machine.

The sides and ends are now ready for pressing together, and in Fig. 2 is shown a power press for this purpose, of special design. A shallow glue tank is provided (see extreme right of picture), into which the operator dips the pins of the dovetails to the required depth, and roughly knocks the case together. The box is then put into the press, and a lever, to the right-hand side of the machine, squares the box up endwise. The operator then releases the clutch, and the power forces the dovetails together, as shown in Fig. 3. The superfluous glue is then washed out of the inside corners, and the box is removed from the machine perfectly square. It is then allowed to stand for a time for the glue to set, when it is ready for the next operation, which is the screwing on of the bottom.

John Broadwood and Sons, Limited, in whose factory these photographs were taken, use a multiple-spindled boring machine of their own design, as shown in Fig. 4. It will be noticed from the illustration that special gigs are provided, into which the shell rests are dropped, and, whilst in this position, they are secured to the bottom of the boxes, thus keeping them to an exact standard. The box itself is then bored to receive screws, which are put in place by hand, and screwed up by a specially devised machine.

Speaking further on the subject of women workers, "The Cabinet Maker" says:

"In view of the pronouncements in the House of Parliament this week as to the renewed demand, which must inevitably be made in order to keep essential industries working at high pressure, these photographs of women, successfully engaged in operating woodworking machinery, are not merely of casual interest,

Fig. 2—Power press for squaring up sides and ends of shell boxes.

Fig. 3—Power press squeezing in the dovetails.

but of vital importance. The strange thing is that in such pictures we do not, at this stage of the war, see anything wonderful. The transition from male to female labor in industry has come gradually, but it is more universal than we realize.

"The person who, three hours before the sun rises, brings the milk for breakfast is no longer a man or a boy, but a woman or a girl. The postman has given place to the postwoman, and the morning paper is no longer brought by a small boy, but by some small boy's sister. The business man who comes to the city by train finds female ticket-collectors at the terminus, and as far as trams and omnibuses are concerned, the place of the conductor knows him no more, and the 'Fares, please!' are asked for in shrill female voices, audibly agitated when the vehicles are overcrowded.

"Arrived at the office, the office boy is no longer a boy, but wears skirts and takes kindly to dusting. The great army of 'he-clerks' has changed into a greater army of 'she-clerks,' and so in every walk of life, other than soldiering, women are carrying on the work which, in pre-war days, it was supposed that only men could perform. The class of women's war work which is illustrated above is comparatively light, but the most instructive set of photographs issued by the War Office last September proves that they are also being employed in very heavy trades.

"One picture shows a depot in which sixty horses are stabled and entirely looked after by women. The loading and unloading of pit props into trucks is about as heavy a job as can be found, but nevertheless, women are doing it quite successfully. The loading and unloading of coal is also no child's play if engaged in for any length of time. Perhaps the most remarkable instance of all is the work that women are doing in shipyards, more particularly in the handling of long steel bars. We instance these occupations in which female labor is already being employed in order to influence quick decisions on the part of the manufacturers in the woodworking industry.

Fig. 4—Screwing on the slides for the shell rests.

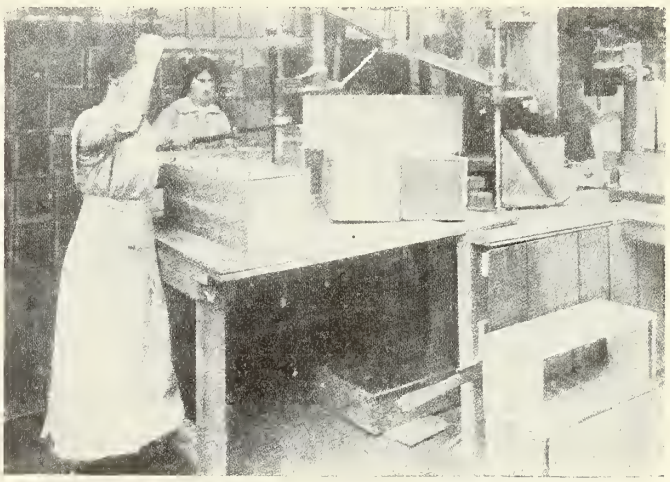


Fig. 5—Operating a multiple spindled boring machine.

Building a Silo a Job for the Planing Mill

Stave Silos the Best—How to Determine the Size Required—Details and Complete Instructions for Getting Out Material and Erecting

Planing mills in cities and towns adjacent to farming districts are frequently called on to get out the material for silos, and in many cases they are even asked to quote a price on the complete silo. If the planing mill man has had no previous experience in silo work, in order to be on the safe side he may name a figure that will make the farmer take the business to a competitor. Then, again, in an effort to secure the business, he may name a price which, through his lack of knowledge of how to go about the work, will cause him to lose money.

If the man will familiarize himself with the details of construction of a silo and the points to be considered in determining its size, he will be able to make suggestions to the farmer and submit an intelligent estimate. The accompanying illustrations and instructions, prepared by the British Columbia Forest Branch, will give the millman the necessary information:

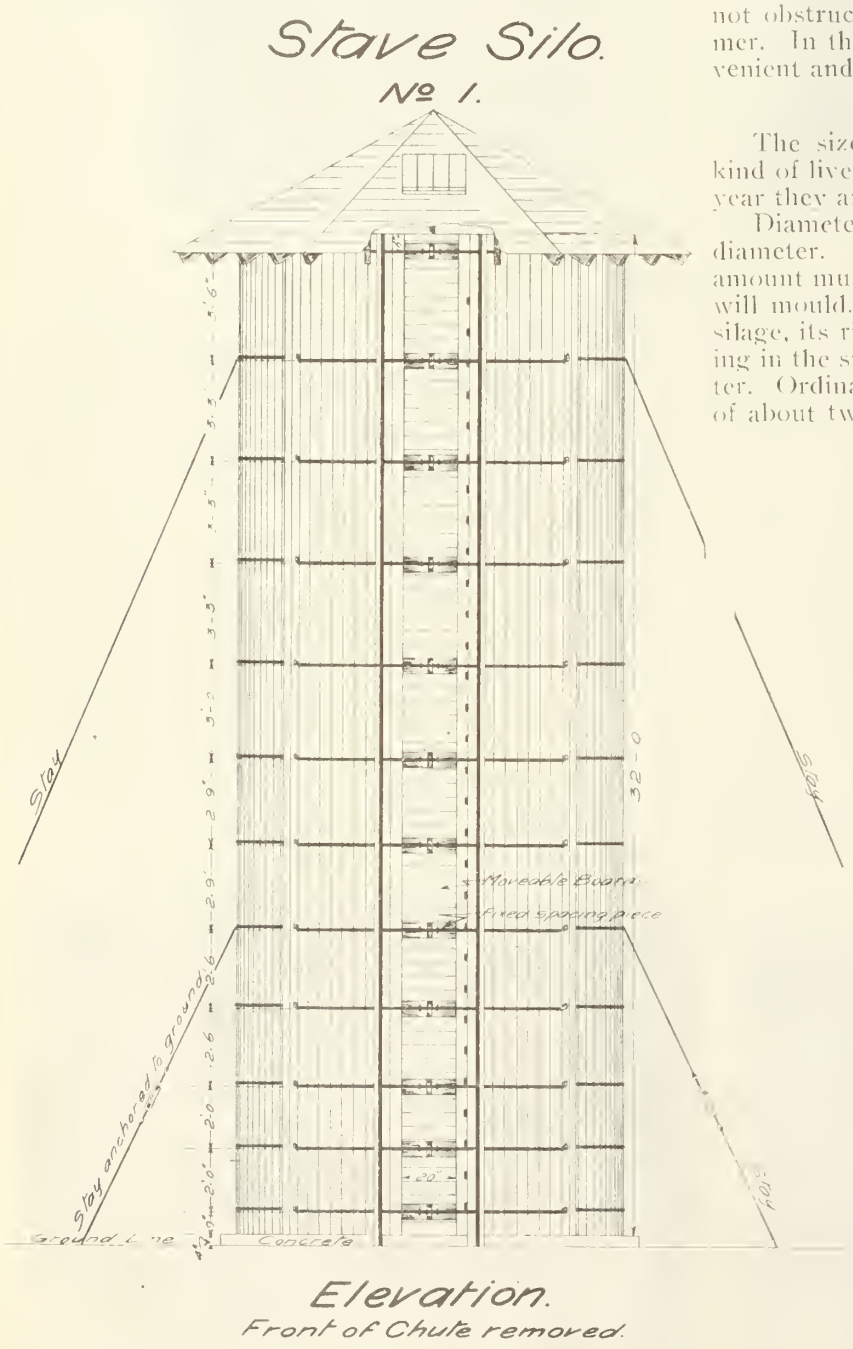


Fig. 1. Except for the fixed spacing-pieces which hold the floor-frame rigid, the door is continuous, and can be taken out in 6-inch sections. The foundation is simply a round, flat slab of concrete.

The best place, as a rule, for the silo, is adjacent to the barn, close to the feed room, and connected with it by a silo-chute. It is then the most convenient for feeding, and the connection gives it additional windfirmness. It is preferable, also, to have it on the north side of the barn, where it breaks the north winds, does not obstruct the sunlight, and dries out less in summer. In the case of a bank barn the silo is most convenient and economical if built into the bank.

Size of Silo.

The size will depend mainly on the number and kind of live stock kept and the number of days in the year they are to be fed.

Diameter.—The first thing to determine is the diameter. After starting to use the silage a certain amount must be fed off the top each day or the surface will mould. This amount will vary with the kind of silage, its ripeness when cut, the firmness of its packing in the silo, and whether it is fed in summer or winter. Ordinarily it will be necessary to feed off a layer of about two inches daily in winter and twice that in summer. Expressed in terms of pounds, the minimum quantities which should be fed daily to prevent spoiling are approximately as follows: There is some difference of opinion as to the silage rations which should be provided for different kinds of stock during winter, or during any time when no other green feed is available, but the following are average figures:

Silo diameter in feet.	Minimum pounds in winter.	Minimum pounds in summer.
8	150	300
10	250	500
12	350	700
14	480	960
16	600	1,200
18	760	1,520

Dairy cattle, 30 to 40 lb. per day.
Beef cattle, 25 to 30 lb. per day.
Calves (500 lb.), 10 to 12 lb. per day.
Horses, 10 to 12 lb. per day.
Colts (500 lb.), 4 to 5 lb. per day.
Sheep, 2 to 3 lb. per day.

From the above two tables it is easy to determine the diameter a silo should be for a given number of stock. For example, for a herd of twelve dairy cows, fed during winter, 40 lb. each, or 480 lb. per day, the silo should not be greater than 14 feet in diameter; if silage is to be used for summer feed, then the silo should not be greater than 9 feet in diameter.

Height.—With the diameter fixed, the

height will be governed by the amount of silage to be stored, and this in turn depends on the number and kind of stock kept and the length of the silage-feeding season. For example, twelve dairy cows fed 480 lb. per day for six months, or 180 days, would require 86,400 lb., or over 43 tons. In this case there are several sizes, any of which could be used —10 x 30 feet, with a capacity of 44 tons; 11 x 26 feet, with the same capacity; and 12 x 24 feet, with a capacity of 47 tons. High, narrow silos are preferable to low, wide ones, because the silage packs and keeps better in the former. It is better to build two small or medium-sized silos than one of very large size, because the smaller ones are stronger and more convenient to fill and to empty.

Certain conditions govern the qualities which a silo must possess in order to give the best results, and which may be summed up as follows:

1. The walls should be air-tight and moisture-tight, to allow fermentation and prevent moulding and rotting.

2. The material of which the walls are built should be a non-conductor of heat and cold, in order to retain the warmth generated in the silage during the fermentation process, which warmth is so essential for the growth and work of the acid-forming bacteria, and also in order to keep out the cold and prevent excessive freezing, especially when the silage is to be used during the winter.

3. The height of the silo should be preferably at least twice its diameter, so that the silage will by its own weight pack down closely and tightly, expel the air, and cure thoroughly all through. The deeper the silo the greater the pressure at the bottom, and more compactly and tightly the silage is pressed together. For this reason a high, narrow silo will hold more silage and keep it better than a low, wide one; also the layer of silage necessary for daily feeding is thinner at the middle or bottom of a silo than at the top.

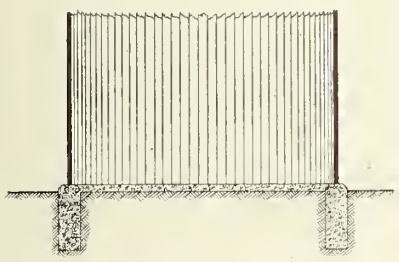


Fig. 3. A common form of silo foundation; is simply a ring-shaped wall.

4. The inner surface of the walls should be smooth, perpendicular, and free from corners, in order to allow the silage to settle freely and evenly without leaving air pockets or cavities. Round silos are much superior to those with angles or corners inside.

5. The silo must be strong to resist the great pressure of the mass of silage. This pressure increases toward the bottom, and therefore the silo needs to be stronger at the bottom than the top. It is also desirable, of course, that it be durable, cheap, and easy to build and keep in repair.

The great majority of silos now in use are of the round or tub type, built of wooden staves, and most authorities are agreed that it is the most satisfactory kind, everything considered, for the average farmer. If properly constructed, the stave silo incorporates practically all the essential qualities mentioned above. It is the right shape, the walls are tight, perpendicular, and very smooth, and wood is practically a non-conductor of heat and cold. The stave silo is also the cheapest and much the easiest to build and maintain or to move to a new site and rebuild, should that ever prove necessary.

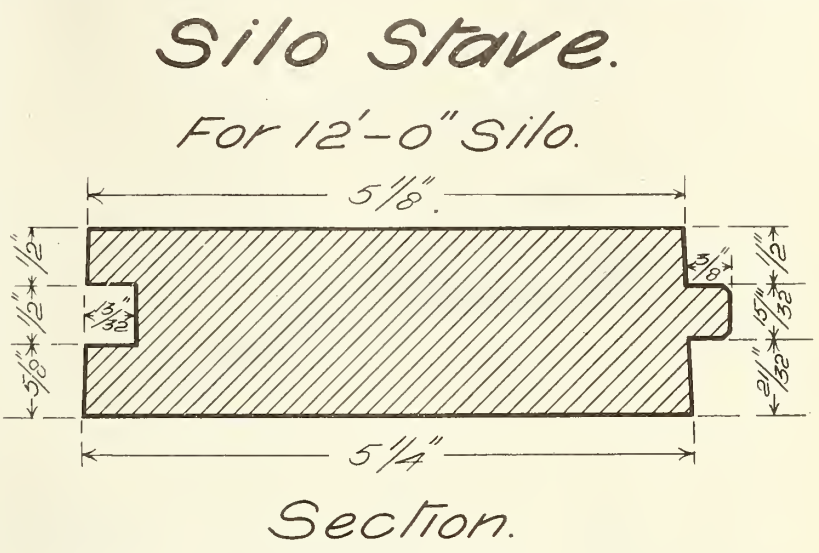


Fig. 2. The dimensions in cross-section of a tongued and grooved stave for a silo 12 feet in diameter.

Foundation Should Be Broad.

Foundation.—The foundation wall should be broad (at least 12 inches wide), and well bedded in solid ground, deep enough to avoid frost-heaving. If a pit or cellar is used, care should be taken to have the inside face of the staves approximately even with the inside wall of the pit, so that there will be no wide ledge to hinder the silage from settling properly. A concrete foundation suitable for a stave silo is a circular, or ring-shaped wall, about 12 inches thick, with the staves resting on the centre of the wall (see Fig. 3). Theoretically the inside faces of the foundation wall and the staves should be exactly flush, but it is necessary to have a wide surface for the staves to rest on, because it is difficult to get the inside of the silo perfectly round, and also because the staves will shrink

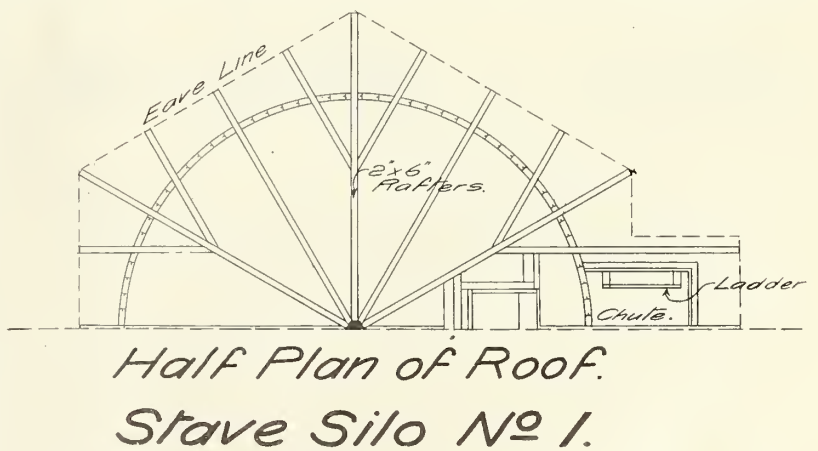


Fig. 4. A six-sided shingle roof easier to make than a round roof. The pieces should first be cut, fitted, and marked on the ground.

a certain amount when dry. The top of the foundation wall should be at least 6 inches above the ground grade, and must be absolutely level. Make wooden forms for this, using water-soaked ½-inch boards, bent round to the circle and fixed to 2 x 4-inch stakes firmly driven into the ground. Be sure that the top edges of the boards are exactly level.

The trench and forms being completed, mix the concrete on a clean board platform, in the proportion of five parts of gravel to one of cement. The mixture should be thoroughly turned over twice dry and twice wet. Sufficient water should be added to make the mixture of a thick, creamy consistency. A convenient quantity of concrete to mix at one time is made up of one bag of cement with five times that quantity of clean gravel. Next proceed to fill the trench and forms. Do not attempt to fill one part of the trench full to the top, but place each mixing in a layer all round the foundation.

Base anchor-bolts are not altogether essential, but will give the silo additional firmness if used. Four would be required, each about ½ x 23 inches, with an eye in the upper end and a hook or elbow in the lower end. Space them around the foundation-wall just outside where the staves will come, with about two-thirds their length sunk in the concrete. After the silo is completed, bolt them to the adjoining staves.

Having filled the trench and forms to the top of the ½-inch boards, take a straight-edged strip of wood and puddle and scrape the top of the concrete exactly level with the top of the forms. The concrete should be left two or three days to set, and the forms can then be removed. Before the concrete has hardened (about five or six hours after filling), scratch a circle on the top of the wall, 5 inches from the inner edge of the foundation, with a large nail driven into the circle-marker. This circle will mark the position of the inside face of the staves, and will serve as a guide when erecting them.

By digging out the earth inside the foundation-wall a little greater storage capacity may be secured. An objection to this, however, is the ledge formed inside the staves by the top of the wall, which interferes to some extent with the settling of the silage at that point. For this reason some prefer to fill the inside level to the top of the wall with earth, or to put in a layer of straw before filling the silo, or to put in a concrete floor. If the earth is dry and firm a concrete floor is not necessary, though it makes the silo easier to clean and prevents rodents from burrowing underneath the silo. If the earth is rather wet, a concrete floor should be made, draining to a hole in the middle, with a tile drain underneath. The hole should be plugged before the silo is filled, and kept open when it is empty.

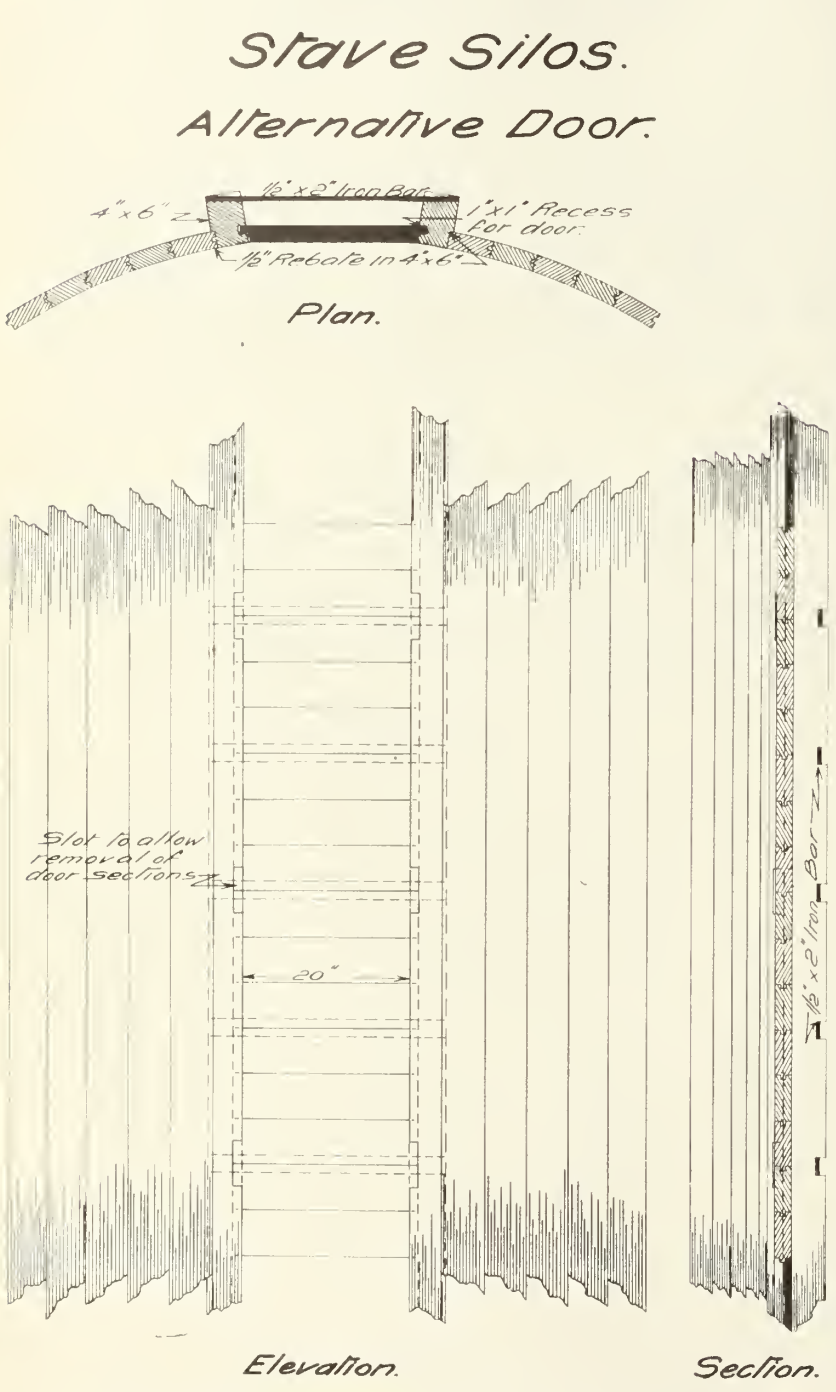


Fig. 5. Form of continuous door suitable for any stave silo. The door boards are simply pieces of 2 x 6-inch stave. The iron bars act as spacers to hold the door-frame rigid and also serve as ladder-rungs.

Tongued and Grooved Staves.

Staves.—A section of one of the 2 x 6-inch tongued and grooved staves is shown in Fig. 2. Either full-length or spliced staves may be used; full-length staves are more convenient to use, while spliced staves are cheaper. A saw-cut is made in each of the adjoining ends of the two staves, and a strong spline or plate of galvanized or coppered iron the full width of the stave is inserted.

The posts and staves should be made of strong, durable wood, resistant to water-soakage. Douglas fir and Western larch are both suitable. It is a good plan to put tar or creosote on the lower ends of the staves which will rest on the foundation. Do not paint or creosote the staves on the inside, as it may taint the silage; leave them clean, just as they come from the mill.

Having placed the posts and hoops in position, next proceed to put up the staves. This will require one

man on the scaffold and another on the ground, the staves being pulled up between the iron hoops about halfway up the silo, and then lowered into place. First erect the two staves on either side of the door opening with the horizontal spacing-pieces between them, and the two 6-inch bevel-cut door-board guides on the inside. These staves form the door-frame, and must be set and braced exactly plumb. The rest of the staves can then be erected, working each way from the door. They may be put up either one by one or several may be fastened together by barrel staves and put up at once.

As the staves are erected, hold them in place by driving staples over the hoops. If the wood is very hard, it may be necessary to bore holes for them. Before the silo is completed each hoop should be stapled to every second stave, in order to prevent the staves from getting out of place in the summer, when, if the silo is empty, the staves will dry and shrink a certain amount. Do not drive the staples all the way in, but leave plenty of room for the rods to slide easily through them. After the staves are up, gradually tighten each hoop, one after the other, until they all have an equal amount of strain.

If two-piece staves are used, the entire bottom part of the silo can be put up and hooped loosely before the upper pieces are put in place. The joints should always be broken (i.e., placed alternately at different heights on the silo).

Anchor-stays.—The six stays or guy-wires should each have a turnbuckle 4 or 5 feet from the ground, to allow them to be tightened and slackened. Attach them to the silo and securely anchor them either to concrete blocks or heavy timbers sunk in the ground.

Roof.—A roof is not absolutely essential, but it strengthens the silo, protects the silage from rain and snow, and, if it is tight, helps a good deal in keeping out frost. A shingle roof is shown for this silo, and recommended as being the warmest and most durable.

Cut and fit the roof timbers and boarding on the ground, and mark each rafter and board (see Fig. 4). They can then be hoisted and fixed in position at once or left until the silo is filled. Before putting the roof on, measure across the top of the silo in several places, to see that it is round. If it is not round, it must be adjusted until it is. To do this it may be necessary to insert another stave or to take one out.

The trap-door for filling the silo can be placed in any one of the six sides of the roof. It should be made in the form of a lid, with overlapping sides; once the silo is filled, it can be screwed on and left until the next time for filling.

Doors.—It is an advantage to have the doors for removing the silage arranged so that the minimum amount of silage will have to be disturbed when a door is taken out. For this reason continuous doors are more convenient than the non-continuous types. The continuous door shown in the silo consists simply of short lengths of stave laid horizontally between the 2 x 6-inch bevel guides, and fixed spacing-pieces placed where the hoops cross the doorway (see Figs. 1 and 5). It is thus necessary to remove only one 6-inch section at a time. These lengths should be cut so as to slide up and down freely. Pockets to hold six or eight of the door-boards should be placed at convenient intervals on the inside of the chute. A pocket can be made of a piece of 2 x 4 nailed across an inside face of the chute for the lower ends of the boards to rest on, with another piece nailed a short distance above it and blocked out from the face of the chute to hold the upper ends of the boards.

A First Aid Dressing Room in the Plant

The Canada Machinery Corporation, of Galt, Ont., have established in their plant a small hospital, or first aid dressing room, for the treatment of employees injured while at work. To any person who has ever witnessed an accident in a manufacturing plant, where the injured party had to bear the pain and wait patiently for the arrival of a doctor, or else be hustled off to the doctor's office—in some cases a half an hour and sometimes more elapsing before treatment could be applied to the wound—the idea of an hospital or first aid dressing room in the plant will make a strong appeal.

The Canada Machinery Corporation is to be commended for its progressiveness and consideration for its workmen in establishing this new department. The company has for its object in supplying and equipping this first aid dressing room the prompt and effective application of first aid treatment, and in minor accidents, the avoidance of the necessity of having the employee taken to the doctor's office for attention.

The room, which is in every respect a modern hospital, is conveniently located in the centre of the big works, and is finished entirely in white enamel, having excellent artificial and natural lighting. The selection of the equipment was done under the advice of Dr. D. Buchanan, the shop benefit society's physician, and in part consists of a white enamelled steel dressing-table, with glass shelves; a white enamelled steel dressing-chair, with adjustable arm and head rests, and dressing-basin; a large white enamelled dressing-table, with leather cushions and adjustable head and foot rests; a stretcher for use in the case of serious accidents; a large white enamelled cupboard containing various bandages, antiseptics, dressings, etc., and a special case of instruments for the use of the doctor in case he is called suddenly to the factory. Running hot and cold water are also available at a large wash basin.

The room and its equipment are most complete, and have been found very serviceable for prompt and antiseptic treatment of those accidents which occur in manufacturing plants.

In the treatment of accidents all of the work does not fall upon the shop physician, for in each department are two qualified first aid men, who have charge of accidents which may occur in their particular part of the works.

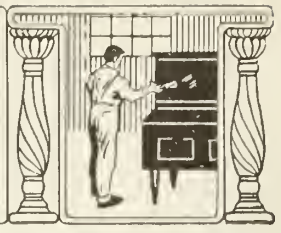
The first aid dressing room is not a requirement of the Workman's Compensation Act, but the company made the innovation in the interests of the employees and to make working conditions as nearly perfect as possible.

At one time saws were almost universally spring set, and crosscut saws are now always so treated; but of late, for ripping saws, many users have discarded the spring for the swage set, claiming that the saws so set remain sharp longer and cut more freely than the spring-set saws, while the advocates of the latter claim that smoother cutting is obtained by this method.

Often a fresh supply of neat oil cans will encourage enough care and economy in the use of oil to more than pay for the cans in a very short time.

If you have a disagreeable task before you, do it first and you will feel better than if you leave it hanging like a damper over your spirits.

THE FINISHING ROOM



Gums Used in the Manufacture of Varnishes

The varnish business calls upon all parts of the world for the materials that enter into the product. We have to go to the Philippine Islands and to the Islands of New Zealand to get our varnish gum. We have gums which come from Africa—from the North Coast, from the East Coast and from the central parts of Africa, and formerly we had gums coming from Mexico, but the Mexican supply is practically exhausted now. I have brought with me three different specimens. (Mr. Hills here showed three speciments).

This is a Kauri gum. It comes in more than one color, some of it somewhat darker and occasionally a little lighter. This is nice, light Kauri and makes a nice light varnish. Here are two specimens of gums that come from the Island of Ceylon, and here are varnishing gums that come from the Congo Free State (the southern part of Africa) and other beautiful gums. Now, this last specimen that I have shown you is one of the hardest and nicest of the gums we use, and we make some of the palest varnish, our fine white maple polishing varnish, from the Congo gum, on account of its very clear, white tone. It's interesting to know where they come from. How do you find them after you go to those places? I can not tell you exactly how they were originally discovered, but probably through being exposed from freshets and clinging to the shores by waters of lakes and streams when they were washed up and found to be lying in layers.

It is true that along the east coast of Africa a great deal of Z gum was originally found on the sea shore, and I have seen pieces of it that had the marks of the sea imprinted in it. What we call X gum is practically out of use by the varnish makers. We make all of our pale varnishes from this Congo gum and some of the pale Kauri. It is supposed that this gum has been lying in some cases for 100,000 years, and in other cases 30,000 or 15,000, because we find three different storage strata. The first gum that was found was within three or four feet from the top of the ground. After the deposit had been exhausted, some enterprising man who had started to search for gums dug lower and discovered two or three lower strata, and further down, about twelve feet, he found still other layers. The idea is that 100,000 years ago a great forest of this Congo region was growing and through natural causes or from cataclysm, it was all knocked down or died down, and the wood all died away, exposing the gum. This gum was buried by the earth. Another forest of these trees grew up; they in turn being covered with earth, the third forest grew.

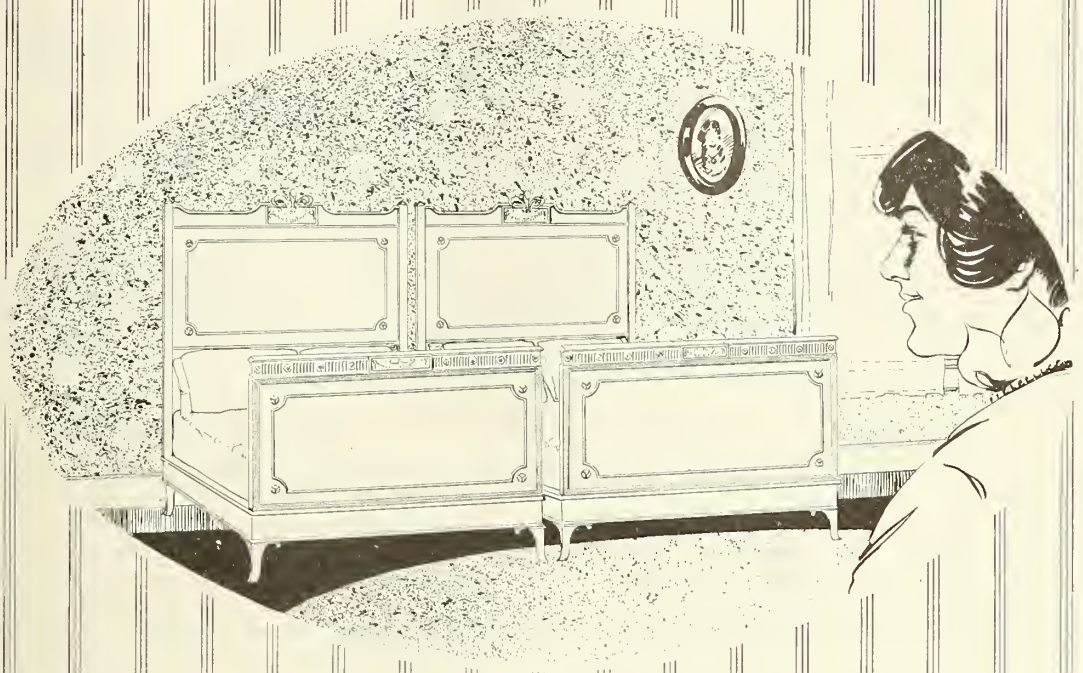
They find this gum in this way. They come along with long iron rods, prodding in the ground. The rod striking something that doesn't seem like a stone, they can tell by the feeling when they are striking gum. Then they simply dig a pit down and find possibly some 100 pounds, or possibly a ton. These gum hunters are, in the main, natives. In New Zealand they are natives. However, there are a good many white men who have gone into the bush to hunt for the gum, which they bring out to their cabins. Then there are gum dealers that go for the gum and bring it into the towns where there are large dealers, and they ship it down to the sea coast where there are extensive dealers, and it is carried to Europe or other seaports and distributed to the various varnish manufacturers.

When they come to us we have various methods of treating them. Now there are some varieties of gum that require a very low heat, and we have to melt it with a great deal of care or we will burn it up. It will require perhaps 500 or 600 degrees of heat to reduce it. The Kauri will melt at about 300 degrees. After it is melted and reduced to a liquid, it is combined with linseed oil in some cases, although in some cases we are calling upon China to supply us with a very valuable ingredient to much of the varnish which is manufactured, because of its good waterproof quality which you cannot get from linseed oil alone, and it also has the peculiar quality of being a self-drier. Linseed has to be treated with chemicals, such as borate of manganese, or other forms of lead solids or other forms of manganese. These hasten the oxidation of the oil. By the addition of China wool oil in certain proportions we get a very rapid drying without the use of different chemicals which are more or less deteriorating. Today a varnish, as we would make it, with a certain addition of China wood oil, would have a greater durability than was the case in years gone by.

Treating the Oils.

Now you see these oils are treated. We have to boil them and purify them by certain processes which produce a different character. An oil becomes duller and broader in its appearance. It takes on a thickness, viscosity, density, when it has been cooked at about 450 to 600 degrees of temperature a certain length of time, and the varnish maker has then what we call varnish oil. Then these varnish gums are combined with the varnish oils and cooked together, and after the compound has been cooked a certain length of time it is taken off the fires (by the way, we cook in copper kettles holding several hundred gallons at a time) and allowed to cool out to about 212 degrees, then we add our naphtha or turpentine and reduce it to a liquid condition. If we didn't apply the finisher to it, it would be like a lump of lead when it became wholly free of heat. We have to add a thinner to keep it in liquid form. It is put through a cylindrical machine, where all the pieces of little stones or sticks in the gum itself are taken out. The varnish is then put into storage tanks to age. We cannot use varnish while it is fresh, but after going into the tank it ripens. After it has been in the tank a cer-

* Address before Retail Furniture Dealers' Association at Indianapolis.



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tain length of time, we put it up in bottles or cans and ship it away to our customers.

There are a good many ways nowadays of putting varnish on the furniture in addition to putting it on with the brush. We often do it by dipping a piece of furniture in a tank of varnish. Then other articles are treated by means of a spray, by means of machinery; in fine factories many pieces of furniture are coated with this spray, which is considered superior because it produces a much more even coat.

One of the great difficulties with modern furniture is in the varnish not drying satisfactorily. Checking is caused sometimes by applying a second coat before the first coat is thoroughly dry, and that leads to "alligatoring" or small checking, which cannot be attributed to the fault of the wood itself, although there are so many causes for the same result that it is pretty hard to put your finger on any one thing and say that that is the cause.

One of the things that is overcoming the checking difficulty very largely is the drying kiln, a varnish drying kiln. This kiln is solving many of the difficulties which formerly every varnish manufacturer had to contend with. This is a kiln that we make, but there are other people that make kilns, and they are good. Generally speaking the kiln does several things which are very much to the advantage of the furniture dealer. In the first place it dries every coat thoroughly before the next coat is put on, and does it about three times as fast. In other words, if it takes 48 hours for the varnish to dry, put it in the kiln and you can have it dry in 18 hours at the furthest. So you could put on three coats in 48 hours, and have each coat harder, dryer and better than if you put on three coats and let each coat dry.

Here are some mahogany panels, and each panel is finished in a different way. Each panel is finished identically up to a certain point; one panel is stained. I want you to appreciate how much labor and how much time it requires to finish a piece of furniture. This method takes a great deal of time. It is stained. The stain is applied with a brush, usually, although sometimes it is dipped. If it is applied with a brush, all excess is wiped off with a cloth, so as to get a nice, uniform solution. Then it is allowed to dry, and it ought to be allowed to stand at least twelve hours, occasionally twenty-four hours. It depends upon whether it is a water stain, acid stain, or oil stain, how long it ought to stand. This took twelve hours. This is all air dried. Then it was filled with paste filler. Mahogany is filled with a paste filler.

Reducing Filler With Naphtha.

The paste filler is reduced with naphtha, then a heavy coat is applied. The pores must be filled, otherwise the brush when it is applied will rub into these pores. After it is well filled, then all of the excess is rubbed off, and it is allowed to stand 24 hours, until it becomes perfectly hard. This one was allowed to stand 48 hours. Then the filling is hard as it can be and it is sandpapered perfectly smooth with fine sandpaper until it is as fine as glass. All the dust is removed, and then a coat of shellac is applied over the stain. Shellac is not necessary over other kinds of wood unless it contains a stain. Almost all mahogany is stained. This is not its natural color. It is all right, unless it is 50 or 60 years of age. Now the general demand is for color like this.

The shellac holds the stain. It is very necessary in mahogany. Then the shellac is sandpapered smooth and after receiving another coat of varnish is rubbed down with pumice stone and water or pumice stone and oil. Then it is cleaned off after it is rubbed down, and is ready for shipment. Now there are ten operations, and they require seven days, but if a kiln is used you will find that you can get that cut down to half in time and get even better results in permanent appearance.

I heard a discussion not long ago as to whether or not there was going to be a return to polished furniture. I just want to put myself on record, that there is always going to be a demand for polished furniture. I have got to tell you that you will have to change human nature, for there are some people that are always going to buy polished furniture. They want something that has a bit of glitter. There are going to be a lot of people that are going to want polished furniture. They will want it as long as they are human beings.

Applying the Filler

As paste filler is rather thick, it must be thinned down to a consistency of about that of mixed paint; a partly worn flat paint brush is the best for rubbing in the filler, which must be rubbed against the grain of the wood and forced into the pores of the wood. As the stuff sets quickly, it is necessary to make haste in the filling, and some of it will be on the surface, which does not matter, as it can be removed later. In about twenty minutes after application of the filler proceed to rub it into the wood, still across the grain, until the pores are all filled. For this work a piece of burlap will do, or tow, and when the rubber is full of the filler it is in the best shape for rubbing in. When done with the rubber, it may be taken apart and used over again. Don't permit the filler to become too dry before you rub it, as it will be difficult, if not impossible, to rub it in. The filled wood should stand a day or two before sandpapering. Then sandpaper it smooth, and if you wish to know exactly how well you have filled the wood, take a magnifying glass and look at it. If you find some of the work not well filled, better apply another filling. Usually one coat of filling does perfectly, though it depends, too, upon the workman. If there are any carved parts to fill, thin up some of the paste filler and apply with a sash tool, then wipe off with a clean cotton rag. A No. 4 painter's sash tool is about the right size.

When your filler sets too rapidly for you, add a few drops of raw linseed oil to it. When the filler is dry rub lightly with No. 0 or 00 sandpaper, then dust off and finish. The surplus filler found in the corners, moldings, etc., may be removed with a simple home-made tool, like the handle of a tooth brush filed down to a point, or a piece of soft stick whittled one end to a point, the other end shaped like a chisel.

How should a filler be made? It may be bought ready made or you can make it, as you prefer. The best may be made from pulverized silica as a base, though cornstarch is sometimes used. Mix together two parts of good coach japan and three parts of raw linseed oil, all by weight. Add to this enough silica or cornstarch to form a stiff paste, and if the mass could then be run through a mill it would be the better for it. At any rate, it must be well worked, made smooth, and this may be done by working it on a board. If it is to be colored, add the pigment before mixing liquid and base. Thin it down with turpentine for use, though many thin with benzine, which, however, is not so good, as it evaporates too quickly, making the rubbing difficult. There you have as good

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a paste filler as can be made. Cornstarch was used before anybody thought of the possibilities of silica, but it is a vegetable material, hence affected by any moisture, causing it to swell. Even though mixed with oil and the other stable materials, it can be affected by dampness.

Formula for Filler.

For those who wish to try it, here is a typical formula: Mix 1-lb. of cornstarch and ½-lb. of pulverized pumicestone, and mix to a paste with ½-pt. of boiled linseed oil and ½-pt. of shellac; add coloring if desired. Some finishers use equal parts of japan and boiled oil, made into a paste with cornstarch; this paste is then reduced with turpentine. Others prefer equal parts of boiled oil, japan and turpentine with the starch. To mix liquids with cornstarch the best way is to pour the liquids over the starch, and let it stand until the mass is permeated through. Cover the vessel to prevent loss of liquids by evaporation. Cooked starch is another form of this filler. Mix together equal parts of boiled oil, turpentine, raw oil, gold size japan, and boil some cornstarch, adding to it while boiling 2-oz. of magnesia to the pound of cornstarch. The starch should boil for about fifteen minutes. If you wish, you can use silica instead of starch, with this formula.

If you should happen to have an unusually open-pored wood to fill, where ordinary paste filler will not do, try this: Mix some cornstarch with shellac, on a stone or marble slab, or glass, as convenient, even a wooden table answering, and work the mass until quite smooth. As this sets very rapidly, it must be applied at once and worked quickly into the wood. As it soon dries it may be sandpapered in a few hours. Wheat flour will do in place of starch, if more convenient. You will find this filler capable of filling the largest of pores. Sometimes chestnut has a very large pore, and oak, too, is often coarse-grained.

In coloring fillers it is best to make the color the same as the lightest part of the wood you wish to fill, and not dark as the main or darker part. This in case you are going to finish it natural, but must color to get uniform surface. Also add the color to the filler gradually, trying it from time to time, and when you get the right shade, stop. Take the lightest colors first, where more than one is required to get the color, and mix with some oil; then take the darker color and mix with a little turpentine; add it to the oil color, and mix both together.

While the usual way to remove surplus filler is with burlap, cotton waste or other suitable material, yet some use a broad-blade knife and press the stuff into the wood all they can, while taking off all that is not required. This is a very good way where a heavy paste filler is used, on very open-pored wood.

Should the paste filler become too dry to rub off, wet it with turpentine until it softens up, or wet the rubbing pad with turpentine, when the filler is not too hard set.

The colors used for coloring fillers are as follows: For oak, raw sienna or ocher; for dark oak, burnt umber or drop black; golden oak, burnt umber or asphaltum; walnut, burnt umber, enriched with a little rose lake or rose pink, or Venetian red; mahogany, burnt sienna, rose pink and a little drop black; cherry, burnt sienna or Venetian red; redwood, burnt sienna and a little rose pink; Brazil wood, rose pink.—By Ashmun Kelly, in "Veneers."

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Veneers and Panels

Re-drying Veneer in the Small Factory

By "Veneer Room Foreman"

The concensus of opinion among men experienced in the laying and handling of veneer and veneered stock is that it is necessary to redry veneer before laying it. This is evident from the various articles appearing in trade journals from time to time, and also from the spoken convictions of veneer room foremen, etc. One of the most noticeable features of nearly all the articles on the subject, however, is that they advocate expensive redrying machines. There is no doubt about the efficiency of these machines, but there are a great many small shops using veneer where the purchase of such a machine is out of the question. A practical illustration will perhaps make the point clear.

The writer has for a number of years had charge of the veneer department in a piano factory. Expensive veneers are used, and the work turned out has to be of the best quality, but there is not anything like enough veneer used to warrant the purchase of a veneer drier, and besides, there would not be room for one. As we very rarely have trouble with our veneered stock, and any trouble we do have is not due to improperly dried veneer, a brief account of our methods may be of interest to the man in the small shop.

In the first place, our veneer cutting and matching department is equipped with a caul box. We have about two dozen basswood cauls which we use for straightening veneers that are not flat enough to be jointed readily. Most of our walnut is butt joint stock, and has to be treated in this way. The veneer is dampened, either with a sponge or by dipping it into a vessel of water. If the latter method is used it is necessary to allow the surplus water to drain off. After being dampened or wet, the veneer is placed between good warm cauls(not red hot ones), about four sheets together, and left over night. Great care should be used in putting pressure on the cauls so as not to interfere with the shrinking of the veneer.

All the pressure we use is a couple of extra cauls. The process of putting the veneer between the warm cauls is repeated three or four times, depending on the condition of the veneer. After the first time the number of thicknesses of veneer is reduced, and the last time they are put in singly. There is a reason for this. Invariably if the veneers are put between the cauls when they are quite damp or wet, particularly if the cauls are overheated, they will split. Some veneers of a brittle nature will split all in pieces. When three or four veneers are put together they rarely split, and the weight of the cauls will be found sufficient to take the "kinks" out of them. Once this is accomplished all that remains is to dry them thoroughly, and considerable pressure may be used to bring them in contact with the cauls.

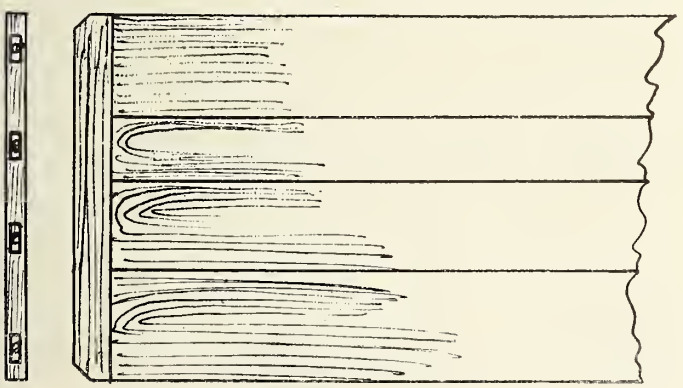


Fig. 1.—Basswood caul with cleat screwed across ends.

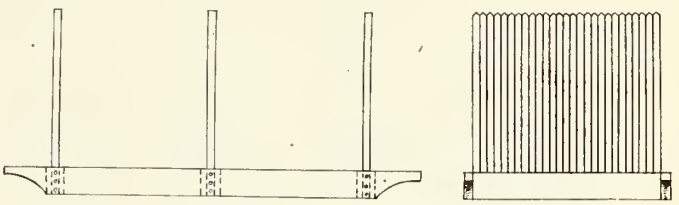


Fig. 2.—Rack for drying veneer.

A few of the wise gentlemen around the factory exchanged some nudges and broad grins when the superintendent billed out basswood for the cauls. They prophesied all kinds of trouble, but the trouble did not happen. It turned out that basswood was the very best kind of wood that could have been used. As every woodworker knows, basswood will take up moisture like a blotter and then dry out again, just about as quick. Thus the wise ones anticipated that the cauls would go to pieces in a very short time, whereas by taking advantage of these characteristics, and making provision for the swelling and shrinking tendencies, excellent results are obtained. The amount of moisture absorbed by the cauls can be limited to some extent by placing a thickness of newspaper between the veneers and the cauls.

In making the cauls, enough pieces to make the required width should be jointed together, and then a cleat about two or two and one-half inches wide should be screwed across each end. (See Fig. 1). It will be noticed that the screw holes are made and countersunk so that the board can swell or shrink without any danger of splitting. Cauls are sometimes made with these cleats dowelled on, but this should never be done. The swelling and shrinking causes the dowels to loosen up in a very short time, and then the cauls go to pieces.

We always tape all our veneer across the ends; it pays in the long run. Our method of redrying all veneer other than that dried between hot cauls is to place it in a rack like the one shown at Fig. 2, and then place the rack in the caul box. The length of time it stays in depends on the heat in the caul box.

It is an easy matter to tell when the veneer is thoroughly dry. A person can tell as soon as they open the door of the caul box whether there is any moisture inside.

The construction of the rack does not require much explanation. The size can be adapted to individual requirements, such as the sizes of the veneer to be dried, the size of the caul box, etc. Ours are about four feet long, two feet wide and two feet high. There are two side pieces about four inches wide, bandsawed at each end to form a handle. The three upright pieces are simply pieces of boards with saw cuts run in them to hold the veneers. The side pieces are screwed to the uprights.

It is obvious that if it was left like this the upright pieces would be very easily split. Therefore, each upright is stiffened by screwing to each side of it at the bottom, a piece of stuff the same width as the side pieces. It will be found very convenient to have two or three of these racks. A boy can fill and empty them, and as soon as one is taken out of the caul box another can be put in. With a fairly hot caul box, an hour is plenty of time for the veneer to remain in the heater. A lot of veneer can be dried very quickly in this manner.

Important Points in Selecting Veneer Presses

By Frank B. McMillin

As the scarcity of good lumber becomes more acute the necessity of good veneered products grows more important. In recent years much thought has been given the veneer industry. However, a policy of co-operation among veneer manufacturers does not prevail as it should. There still is a tendency towards secrecy in some of the processes and methods of obtaining a good veneered product. This is a mistake, because the industry cannot progress as long as its manufacturers do not profit by each other's experience. Nothing can be gained by hiding one's light under the bushel.

The veneer business is divided into two general classes: The first consists of the manufacture of veneer. The equipment for this process consists of steaming vats, cutting machines, dryers, taping machines, sanders and cutters. There are two general types of machines used for shaving the veneer, the rotary cutter and the straight cutter. Most of our native woods are cut on the rotary cutting machine as the logs are received in the rough with the bark on. Mahogany and other imported woods are usually cut on the straight cutting machine as they are squared and hewed before being shipped into this country. There are various types of dryers being used which have proved successful. In some of the most expensive woods these veneers are cut very thin. The very thin veneers are used to some extent by gluing them to a wall board of some kind, thus forming panels for interior decoration. In some cases these wall boards are made heavy enough to take the place of plaster.

The second division of the veneer business is that of the panel laying and gluing process. It is a separate business from that of the cutting process. Comparatively few manufacturers engage in both branches of the business. Most of the panel manufacturers purchase the veneers in bales and lay up the panels to suit the work for which they are to be used. The laying of veneered panels requires considerable experience as there are so many things to interfere with the making of a first class panel. There is considerable difference of opinion in regard to the amount of pressure necessary to do this work. A great deal of stock is spoiled on account of having received an insufficient amount of pressure. However, very little stock is damaged by applying too much pressure. Any damage from too little pressure may not become apparent until the panel has been made up and finished. The only damage from over-pressure is in crushing the cores where a soft wood is used.

There are a great many grades of work being put up at the present time. This work ranges from the first-class panel made up for fine furniture and interior finish to the cheap three and five-ply panels used in building packing boxes and cases. The amount of pressure required to do good work depends largely upon the class of work that is being made. The finer the work, the better it is necessary to prepare the surfaces. Nicely prepared panels do not require quite as much pressure as the rough ones. It is well to use all the pressure that can safely be applied without crushing or distorting the cores.

For large panels very heavy presses are required, but some manufacturers are tempted to install a lighter press than is necessary to do good work. Some very good veneer work may be accomplished where the surfaces are nicely prepared with 100 pounds pressure per square inch on the panels, but it is an unusual occurrence. For the coarse panels used in packing boxes and cases, about 200 pounds per square inch is advisable in order to bring the surfaces closely together and to force out all of the air and surplus glue. For ordinary work 150 pounds pressure per square inch is a safe pressure to obtain good work. Cores of most any kind of wood will stand up under this pressure and the pressure is sufficient to bring the surfaces firmly together and to prevent the pocketing of the glue.

Veneering should be done as rapidly as possible, especially where high grade work is being done. In this case the veneers are very thin and the cores heavy. When the veneer is placed on the core, wet glue penetrates it very quickly on account of it being so thin and it immediately begins to swell. Being heavy the core is not penetrated so quickly and, of course, it does not swell so rapidly as the veneer. When the pressure is applied there is no chance for the veneer to contract as it dries. The pressure is held on the package until the panels are perfectly dry. If the panels go from the press room to the finishing department and are finished quickly the checking quite frequently does not take place until after the varnish has been applied. This causes the checking of the panel, which is frequently laid to the finishing department instead of the press. The checking may be overcome:—First, by applying sufficient pressure; second, by applying it quickly, before the veneer or the core has a chance to swell; third, by applying the pressure uniformly the same on each square inch of the package.

The glue manufacturers quite frequently have to answer for defects in panels that are caused by too little pressure being applied when the veneer was laid. Immediately on finding defective panels caused by too little pressure the blame is laid at the door of the glue manufacturer, because this is the easiest thing to do. The veneer manufacturer does not think to look into his pressure methods. If he would, he would probably find that the press manufacturer has furnished him with a press unsuited for his work and with too little pressure.

There are a great many secret processes for mak-

OAK MAHOGANY CIRCASSIAN MAPLE

VENEERS

BIRCH POPLAR CHERRY WALNUT GUM

THE OHIO VENEER COMPANY

Importers and Manufacturers

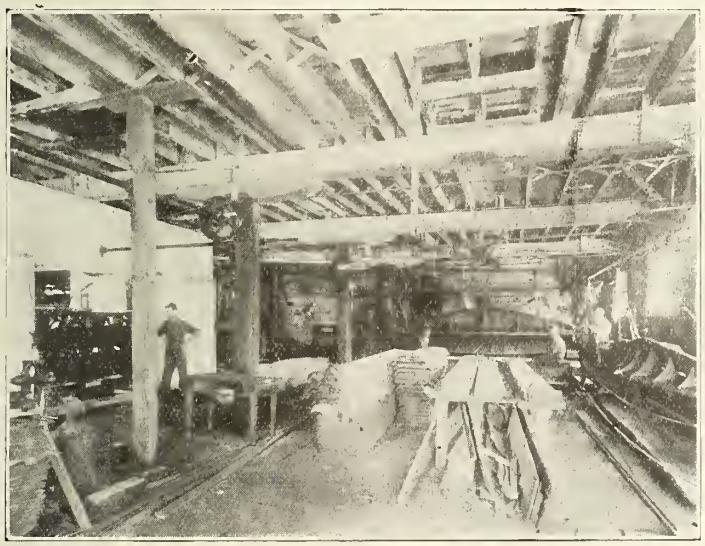
Foreign and Domestic Veneers and Hardwood Lumber

We always carry a large and assorted stock of Mahogany, Circassian Walnut, Sawed and Sliced Quartered Oak.

Send us your enquiries and orders. We guarantee good service.

2624 to 2644 Colerain Avenue, — — CINCINNATI, OHIO.

"You Can't Mistake the Flake"



That's our slogan because the flake in "H.B." veneers produces such a rich figure that there is no mistaking it.

HB

Reg U.S. Pat. Off.

Established 1867
Incorporated 1904

OAK VENEERS

Honest inspection and intelligent selection gained in fifty years' experience enables us to produce the very finest veneers. Our product is made exclusively from Indiana White Oak —the best that grows for our purpose.

A trial will convince you.

Hoffman Brothers Co., 800 West Main St. Fort Wayne, Ind.

WE SPECIALIZE ON—

POPLAR CROSS-BANDING AND BACKING VENEER

Highest Grade — Right Prices

The Largest Poplar Veneer Mill in the World

THE CENTRAL VENEER CO., HUNTINGTON, WEST VIRGINIA

ing glue used on veneers to some extent in this country. These originate mostly in Germany and require presses with hot plates. This process is quite different from the regular process of laying veneers, and requires different treatment.

Sanding Crotch Veneers

O. G. and other bent work, where the grain of the veneer runs with the curve, may be sanded across the grain. This may be done on either crotch, stripe or plain veneer. Do not use too coarse a paper for the first sanding, and do not cut too deep before changing to a finer paper. Fear of scratches is the reason for not sanding across the grain, but a careful selection of the different grades of paper will prevent this trouble.

I was forced into an experiment along this line some time ago. The crotch veneer on some O. G. drawers was very bad, and it looked like an age-long job to sand them with the grain of the veneer, which ran with the curve. Some plan for sanding them had to be devised in order to make a smooth job, or the finisher would have to put on two or three extra coats of varnish, and this would mean a lot of extra rubbing in the finishing room.

We decided to take a chance and adopt desperate measures. The worst drawer in the lot was selected and the rough cut off with No. 1 paper, sanding across the grain. This was followed with No. ½ paper, then with No. 0 paper, and finally finishing with No. 00 paper. This made a perfect job, and, after the drawers were finished, the most careful examination failed to discover the slightest sign of a scratch.

Since then all our O. G. is sanded in this way—oak, mahogany, stripe, or crotch—and all other veneers are treated in the same way, and the results are equally satisfactory.—W. T. Wilcox in Veneers.

The Standard Caul Box

What is called the "standard" caul box or compartment for heating cauls is a type recommended by insurance people specializing in woodworking plants. Instead of being a tight box, it is open at the bottom and is lined with tin. The specifications for it, as given by the Insurance Standard Wood Worker, are as follows:

The steam pipes should be 2½ feet above the floor and rest upon iron supports. There should be no bottom in the box, but the sides should extend 6 inches below the steam pipe. The box should be lined with tin, which is a safeguard against fire, and, besides, the tin reflects the heat upon the stock in the box. The purpose of a box of this kind is to heat cauls or to heat core stock preparatory to use in the glue room. It can be heated with exhaust steam or live steam at low pressure from 2 to 3 pounds.

Glass is bound to be scarce, poor in quality, and high in price until after the war. There will be a shortage this year of over 16,000,000 feet. The United States, before the war, was an importer; now it is exporting part of the product. Canada previously imported all of her supply from Belgium and England. Now the Belgium factories are closed or in ruins, while England is keeping most of her supplies at home. Many a glass factory in that country was commandeered by the government and turned into munition plants.

VENEERS and SERVICE

When you need an order in a hurry

What is the first thing you think of? "Where can I get what I want—and get it in a hurry?" No use worrying about it from now on. Service to our customers is our first consideration when filling an order.

If you have time, just drop in at our warerooms, where we carry one of the largest stocks in Canada, and pick out just what you want. If it is not an order where careful matching is required, send a wire or 'phone us. We can assure you that in both cases your order will receive the individual attention of a veneer expert and be shipped to you the day we get your instructions.

We carry an extensive stock of MAHOGANY, AMERICAN BLACK WALNUT, QUARTERED OAK, FIGURED QUARTERED GUM and Rotary Cut Veneers in POPLAR, MAPLE, OAK, GUM, and BIRCH.

For right prices and quick, satisfactory service, write us.

Toronto Veneer Company

TORONTO 93-99 Spadina Ave. ONTARIO

OAK MAHOGANY CIRCASSIAN MAPLE

VENEERS

BIRCH POPLAR CHERRY WALNUT GUM

Wood - Mosaic Co.
NEW ALBANY, - - IND.

WALNUT
Lumber - Dimensions - Veneers

If you are in the market for anything in Walnut, let us figure with you. We have cut three million feet of Walnut in the last year, and have a good stock of all thicknesses dry. We can also furnish Walnut dimension—**Walnut Veneers.** We have a large stock of veneers, plain, stripe figured and stump wood.

Wood-Mosaic Co., Inc.
NEW ALBANY, - - IND.

K QUALITY

TEAK

K QUALITY

DOMESTIC LUMBER

Write for prices on all
Plain and Fancy Lumbers and Veneers
Mahogany, Oak, Birch, Walnut, Ash, Poplar, etc., rotary, sliced or sawed in all thicknesses
SHELL BOX PARTS in birch and spruce
Bridges and Ends
Write for Quotations
George Kersley
224 St. James Street, Montreal

K QUALITY

MAHOGANY

K QUALITY

Notice—Change in Name

Effective October 16th, 1916. The Roberts Veneer Company succeeded the Roberts and Conner Company and John N. Roberts, Veneer Manufacturers.

The Roberts and Conner Company and John N. Roberts desire to thank their many friends for their long and continued patronage and bespeak a continuance of same with the Roberts Veneer Company.

The Roberts Veneer Company will continue to produce Veneers in Walnut, Oak and Poplar, specializing on American Walnut in sliced, half-round and stump wood.

Roberts Veneer Co., New Albany, Ind.

OAK MAHOGANY CIRCASSIAN MAPLE

VENEERS

BIRCH POPLAR CHERRY WALNUT GUM

Mahogany
Figured Red Gum
American Walnut
Curly Birch
Quartered White Oak
(Sawn or Slice Cut)
And all other kinds of

Domestic Veneer

AND

Thin Lumber

ACME VENEER & LUMBER CO.
8th, Harriet and 7th Streets - - - - CINCINNATI, Ohio

200,000 Ft. ¼" Gum
12 to 36" wide, 60 to 84" long
DRAWER BOTTOMS
AND
BOX STOCK
For Quick Shipment
GEO. L. WAETJEN & CO.
MILWAUKEE - - - WISCONSIN

Veneers and Panels
PANELS
Stock Sizes for Immediate Shipment
All Woods All Thicknesses 3 and 5 Ply
or made to your specifications
VENEERS
5 Million feet for Immediate Shipment
Any Kind of Wood Any Thickness
J. J. NARTZIK
1966-76 Maud Ave., - - CHICAGO, ILL.

THE GLUE BOOK

WHAT IT CONTAINS

Chapter 1—*Historical Notes*
Chapter 2—*Manufacture of Glue*
Chapter 3—*Testing and Grading*
Chapter 4—*Methods in the Glue Room*
Chapter 5—*Glue Room Equipment*
Chapter 6—*Selection of Glue*

Woodworker Publishing Co., Ltd.
345 Adelaide St. West, Toronto

OAK MAHOGANY CIRCASSIAN MAPLE

VENEERS

BIRCH POPLAR CHERRY WALNUT GUM

Burl Walnut Veneers

We have some exceptionally fine burl veneers in American Walnut. In figure, color and general attractiveness this stock is really remarkable, and must be seen to be appreciated. If you are interested in material which is out of the ordinary and is suitable for the highest class of cabinet work or interior trim, ask us to send samples. We know that you will be interested.

Penrod Walnut & Veneer Co.

"WALNUT SPECIALISTS FOR THIRTY YEARS"

KANSAS CITY, Mo.

Indiana White Oak Lumber and Veneers

Band sawed from the best growth of timber.
We use only the best quality of Indiana White Oak.
From four to five million feet always on hand.

Walnut Lumber

Our stock assures you good service.

Chas. H. Barnaby, Greencastle, Indiana

Haughton Veneer Company

Office: 122 S. Michigan Ave.

Warehouse: 1150-52 W. Lake St.

Chicago - Illinois

American Walnut

Quartered

White and Red Oak

Mahogany

LET US QUOTE YOU

The Lumber Market

Domestic Woods

As woodworking plants in general have not had sufficient time to get under way again after the yearly stocktaking, there has been very little change in the lumber situation. Stocks are still scarce and there is very little chance of prices going lower. From all appearances the demand will continue much as it has been during recent months. It may even be increased owing to the recent decision of the Munitions Board to restrict the amount of shell contracts being let in the United States, as this will undoubtedly mean that greater quantities of shell boxes will be required.

Lumber firms are able to dispose of their product without soliciting business. The manager of a woodworking plant told the writer a few days ago that it is a number of years since lumber salesmen have been as scarce as they are now. He says that ordinarily, from eight to twelve, and sometimes more lumber salesmen called at his office in a week. Now from one to two is about the limit; and these are usually men representing concerns with whom he has been accustomed to doing business. They are simply making their rounds to keep their connections, and the lists of stocks which they have to offer are very limited.

The manager referred to above regarded the scarcity of salesmen on the road as significant. He is no doubt correct in his assumptions. Probably no better barometer exists in any line of business than the salesmen. When a firm finds a stock of its product accumulating it hustles salesmen out on the road to dispose of it, and vice versa, when the demand is as great or greater than the supply, salesmen are not required. This is precisely the position in which lumbermen find themselves today. Orders are coming to them as fast, or faster, than they can fill them. Prices are firm and if there is any tendency to change at all, it is towards an increase. The production of logs this winter will be comparatively light, and as available stocks are down about as low as they can go, prices will go higher if anything.

Prices on some of the leading woods at Toronto, car lots, are as follows: White ash, 1sts and 2nds, 1½ and 2 inch, $60; birch, 1sts and 2nds, inch, $44; basswood, 1sts and 2nds, inch, $45; soft elm, 1sts and 2nds, inch, $40; rock elm, 1sts and 2nds, 1½ and 2 inch, $55; soft maple, 1sts and 2nds, inch, $33; hard maple, 1sts and 2nds, inch, $40; Douglas fir, No. 1 and 2, 1 inch clear, $44.50.

Imported Woods

We believe we are safe in saying that owing to the unprecedented period of prosperity in the United States, furniture factories and woodworking plants have been running to the limit of their capacities, and the indications are that they will continue to do so for some time. Practically all grades of lumber are in demand and prices are going higher. Lumber dealers expected a slight period of depression during the first weeks in the new year, while the various woodworking plants were making their inventories, etc. It appears, however, from recent reports, that the inventories have been completed in a remarkably short space of time, and the demand for lumber is nearly as brisk as it was during the last few months.

A situation that appears to be gradually becoming stronger exists with hardwoods, both northern and southern. An apparently strong demand from everywhere for almost every kind of hardwood seems to be the rule, and current prices are strong, especially on red and sap gum and birch. In the Chicago market the prices prevailing for birch are from $1 to $2 higher than two weeks ago, and about the same situation exists with other hardwoods. Maple, elm and basswood are being sold at higher prices. Gum, both red and sap, is very strong, and oak, both plain and quartered, has not lost in popularity. A lot of low grade hardwoods are being consumed by box factories, as the prosperous condition of the country in general has created a large demand for containers. The continued activity of the building trades in the United States keeps the hardwood flooring factories busy, and consequently they are in the market for large quantities of lumber. The railroads are also said to be buying hardwoods in large quantities for the construction of cars.

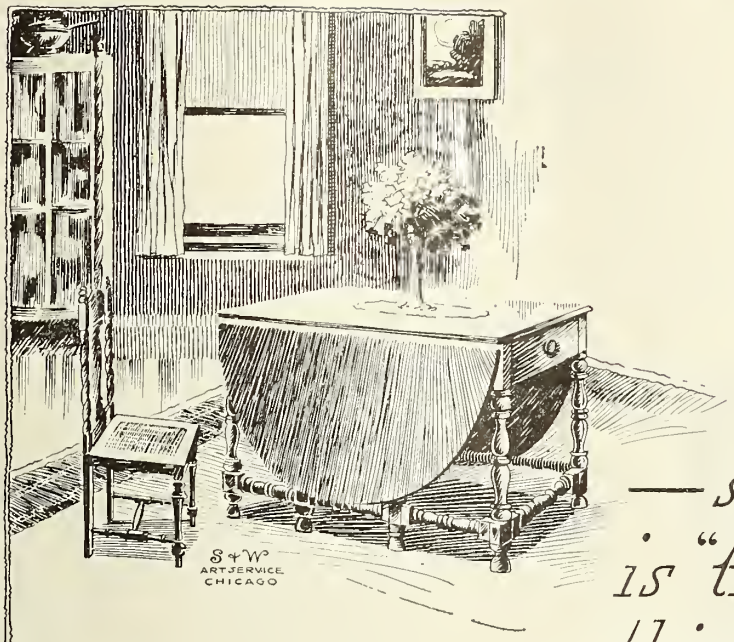
It is stated on authority that the sellers of lumber are not showing any inclination to enter into contracts on the basis of present prices. Prevailing conditions in the logging territories are such as to stiffen prices rather than reduce them. For instance, water rises in the Mississippi around Memphis enabled the mills to get in a goodly supply of logs, but the cold, slushy weather has made it impossible to produce any great stock of logs in the woods; therefore, even if the condition of the river remains favorable for getting logs to the mills, the mills will not be benefited because there will be very few logs to take.

The car situation remains practically as serious as it was, thus making deliveries difficult. There are no features in connection with the hardwood situation in the northern section of the United States that would indicate any drop in prices. It is reported that one large order was placed recently at the full list price and that there have been suggestions of other orders at higher figures. Labor is scarce in the United States, and what there is is high priced. The indications are, therefore, that the production of logs in the woods and the cut at the mills will not be more than sufficient to meet the demands of the trade. There will be no accumulation of stocks.

Some of the prices quoted on popular hardwoods in the Boston market are as follows: Maple, firsts and seconds, inch, $47, and in some cases even a little higher; sap birch of the same grade, inch thickness, has sold at $52, a price that red birch fetched a short time ago; basswood, $45 to $48; white ash, $56 to $61; quartered oak, $89 to $91; plain oak, $63 to $65; chestnut, $52 to $54.

Basswood in Toy-Making

During the past two years the toy industry of the United States has developed enormously, due to the phenomenal growth in both domestic and foreign demand, with the result that it has become a material factor in the use and consumption of wood. The chief wood used in toy-making is basswood, and the statistics gathered by the Forest Service in 1914 showed that approximately 90 per cent. of the thirty million feet of wood consumed in toy production that year was basswood, the remaining 10 per cent. being divided between maple, beech, birch, and white pine.—Playthings.



QUALITY—

—said Noah Webster is "that which makes a thing such as it is"

BEAUTY of design, best of materials, perfect workmanship make of modern Period furniture prized heirlooms for our grandchildren, demonstrating the old adage that "the ***best*** is in the end the ***cheapest.***" And this is what we offer you in Lumber and Rotary Stock—***First Quality***—the cheapest because the best—

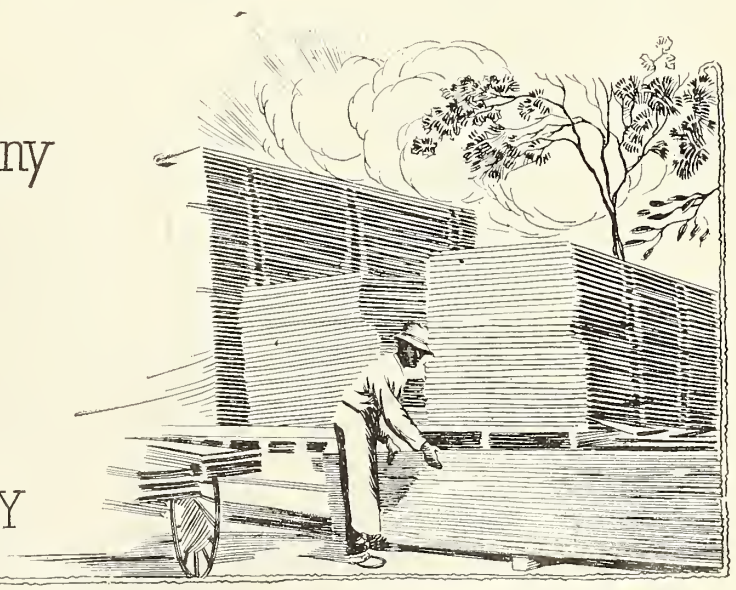
Oak, Gum and other Southern Hardwoods manufactured with care from fine, live timber, seasoned properly;

Gum Core Stock, Crossbanding, Built-up Panels and Drawer Bottoms perfectly cut, perfectly dried, staunchly crated;

All graded under the only rule we know—THE GOLDEN RULE.

To serve you today is to have you encore that service tomorrow.

Write now.



Anderson-Tully Company

Memphis Tennessee

Chicago Office:
GEORGE B. OSGOOD, Peoples Gas Bldg.

Grand Rapids, Mich., Office:
FRANK B. LANE, Houseman Bldg.

QUALITY MEANS ECONOMY

Will Keep in Touch with Canadian Trade

After having been located in Toronto for the past two years, Mr. E. P. Morden, Canadian representative of the Cyrus C. Shafer Lumber Company, of South Bend, Ind., has moved to South Bend, where he will be glad to have his friends in the Canadian trade address him in future.

The Cyrus C. Shafer Company have recently purchased a large tract of timber and a large band mill in Mississippi. The mill has an output of about eight to ten million feet per year, and at this mill the company expect to manufacture largely 4/4, 5/4, and 6/4 inch

An alley in the Cyrus C. Shafer Lumber Company's yard at Cairo, Ill.

oak, the quality of which they claim makes it especialy suitable for the furniture trade. With the oak the company will also manufacture a large amount of poplar and gum.

Mr. Morden advises us that during the past year his company has enjoyed a large volume of business from Canada, and that, although he has moved to South Bend, he expects to keep in close personal touch with the Canadian trade. The accompanying photograph shows an alley flanked by two rows of well-stacked lumber in the Cyrus C. Shafer Company's yard at Cairo, Ill.

Woodenware Wanted in Belfast

In the latest issue of the Department of Trade and Commerce Weekly Bulletin there is a report from one of the department's trade commissioners who has recently been in communication with some leading merchants of Belfast, Ireland. He states that there is a demand for all descriptions of woodenware, quantities of which were formerly imported from Sweden and other countries, such as window poles with ends, rings and brackets, 5 feet, 6 feet, and 8 feet long, with 1½ inch nominal; washboards, both of wood and with corrugated zinc panel; corn brooms; split and spring clothespegs; cheap all-wood chairs, such as are used in this country in kitchens; also the better class of bentwood chair to take the place of the Austrian; spring rollers for window blinds; children's cradles; chair stock; brushes; handles, etc.; boxboards; doors, mouldings; rock maple rollers, 24/26 inch by 6/6½ inch, octagonal, and by 6½ inch to 10 inch; spruce and hemlock broom handles, and turned woodenware of all kinds.

He further states that, while a number of these articles are at present on the prohibited list of importations into the United Kingdom, it would be well for Canadian manufacturers to get in touch with Belfast firms looking to future trade. Names and addresses of enquirers can be obtained from the Commercial Intelligence Branch, Department of Trade and Commerce, Ottawa.

Demand for Labor-Saving Machinery

The Preston Woodworking Machinery Company, Preston, Ont., writing us recently, state that they notice a considerable demand from owners of woodworking plants for machines that will in any way increase production and decrease the amount of man-power required to operate their factories. The company's high-speed ball bearing shaper and patented veneer taping machine, coming under this category, they say that they have done considerable business in supplying these two machines to the trade. Also the patented steam retort for bending wood, made by them, has been selling very readily.

Apart from the woodworking machines, the company advise us that their plant has been exceptionally busy for the last two years manufacturing engine lathes for munition purposes. They are the sole makers of the Stephens lathe, and during last year they shipped over one hundred of these to the Ministry of Munitions of War in England, for use in the different arsenals. The company have a letter from the Director of Machine Tools, under date of November 24th, advising them that their lathes have given good satisfaction.

Marietta Paint & Color Company Stockholders Meet

The Marietta Paint & Color Company, of Marietta, Ohio, held its annual meeting of stockholders January 8th, 1917. The report of the President, Mr. C. L. La Vallee, showed 1916 to have been by far the greatest year in the history of the company.

This company is one of the most aggressive and highly reputed manufacturers of wood finishes for the furniture, piano and talking machine trades.

Among the changes in the company's policy reported by Mr. La Vallee, was the appointment of John H. Rennard, of Wheeling, W.Va., to take exclusive charge of the company's advertising, instead of having the advertising agency of which Mr. Rennard was President, handle this advertising.

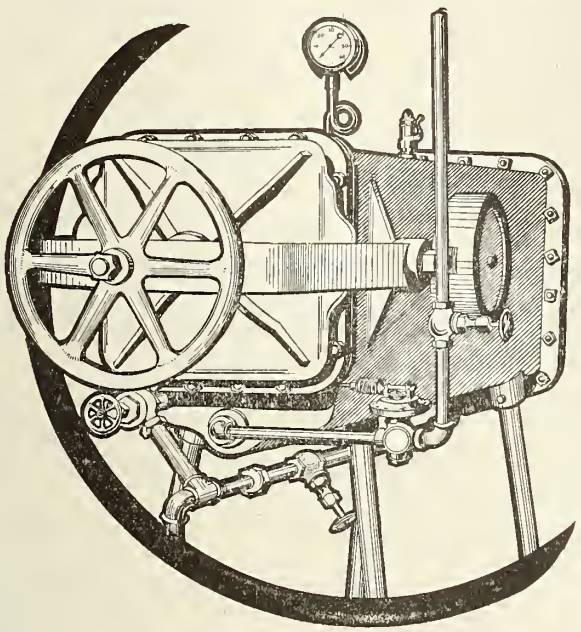
Moved to Larger Offices

Owing to the rapid growth of their business, the Huddleston-Marsh Mahogany Company have found it necessary to move their offices into more spacious quarters at Suite No. 1107-12 Aeolian Hall, 33 West Forty-second Street, New York, where they will be glad to receive communications and visits from their friends in the trade. The company's offices were formerly located in Suite No. 1822-23, in the same building.

It is not only easier to find faults in the other fellow's work than it is to offer something better, but there are more people ready to do it.

The inveterate gossip usually begins by saying that he doesn't like to talk about anybody, then proceeds to prove that he does like to.

Wood Steaming Retort



Wood Bending Manufacturers:

This is one of our

Perfection Retorts

which we guarantee will save you

50% Less Breakage

in your bending department than your present process; that your stock will dry in your forms or presses in one-third less time; that you will have no stained stock; that your stock will retain its shape much better after being bent; that it will dry in your dry-kiln in one-half less time and that your steam consumption will be reduced at least 90 per cent.

The door can be opened and closed in ten seconds, and it is steam and water tight and for this reason can be placed anywhere in your factory.

Compare this IMPROVED RETORT with your present steam boxes, then write us for our Booklet on Progressive Wood Steaming.

Made in Preston, Ontario

Perfection Wood Steaming Retort Co.

PARKERSBURG - WEST VIRGINIA

MAHOGANY of CHARACTER

M B

Martin-Barriss hardwoods offer something new in the way of service. This is particularly true of our thoroughly kiln-dried mahogany. If you require mahogany of character, possessing any particular figure, we are prepared to cut into log after log to obtain that figure.

Ask us about our service and prices.

The Martin-Barriss Co.
Cleveland, Ohio

BLACK WALNUT

Large Stock 1 to 3 inches thick ready for immediate shipment

also

Well Assorted Stocks of

West Virginia & Kentucky

OAK

Ash, Maple, Hickory, Chestnut, Basswood and Poplar

Prices and stock list on request

Burns & Knapp
Lumber Company
CONNEAUTVILLE, PA.

News of the Trade

J. W. Drake, of the J. W. Drake Furniture Company, Windsor, Ont., is dead.

The Doherty Piano Company, Limited, of Clinton, Ont., has assigned to James H. Thomas.

Mr. Jos. Carter, who for a number of years conducted a stave mill at Blythe, Ont., is dead.

Mr. F. W. Millhouse, a former teacher in the Northern Business College, Owen Sound, has accepted a position as accountant for the Chesley Furniture Company, Chesley, Ont.

The Canadian Government artificial limb factory, at 37 Buchanan Street, Toronto, has been equipped with up-to-date machinery and a number of expert limb makers have been engaged.

Mayor Church of Toronto, has definitely announced that the new aeroplane factory to be established in Canada for the Imperial Munitions Board will be located in Toronto. No particulars are available as yet.

The plant of the "Canadian Woodworkers" at Sarnia, Ont., has been sold to the H. Lougheed Machinery Company, who expect to have it in operation within a few weeks manufacturing supplies for the Allies.

A. H. Chave and Company, Limited, has been incorporated with a capital of $50,000. They have opened an office in the Dominion Express Building, Montreal, and will deal in hardwoods, specializing in mahogany and veneers.

Mr. Oion Bowman, of the Promotory Saw Mills, Chilliwack, B. C., is manufacturing apple boxes. There has been a considerable local demand from both wholesalers and retailers, and Mr. Bowman is supplying the demand.

The death occurred recently of Thomas H. Angell, mechanical superintendent of the J. C. Mundell Furniture Company, Elora, Ont. Mr. Angell started in the Mundell factory as a boy and had been with the firm for twenty-nine years.

Operating on a capital of $50,000, the Stave Manufacturing Company, Limited, will establish a woodworking plant at Montreal, Que., to manufacture staves and woodenware. Those interested are H. Wooland, W. H. Thomson, W. F. Lee, T. J. Coulter.

The ratepayers of Owen Sound, Ontario, have passed a by-law authorizing a loan of $20,000 to the Keenan Woodenware Manufacturing Company to extend its plant. The company will erect two buildings, each 60 feet by 120 feet and two storeys high.

A meeting of the shareholders, creditors and bondholders of the Nova Scotia Carriages Limited, was held recently, when it was decided to go into liquidation. The liquidators will finish the unfinished stocks. The future of the plant has not been decided on.

A disastrous fire occurred recently at the plant of the Preston Car and Coach Company, Preston, Ont. About a third of the plant, including the erecting and upholstering shops, was destroyed. Three electric cars valued at $45,000, all completed ready for shipment, were a total loss.

The Castle Manufacturing Company, Limited, has been incorporated with capital of $100,000, to manufacture toys, wood novelties, sporting goods, etc. The head office of the company will be at Toronto. J. C. Macfarlane, barrister, E. C. Fetzer and A. Whitehead, all of Toronto, are interested.

While oiling the engine at the plant of the Canada Carriage Company, at Brockville, where he was engaged as engineer, John Grundy received an injury which proved fatal. His head came in contact with the shafting of the engine, which struck him a severe blow over the right temple.

B. C. Raworth, of Sackville, N.B., after carrying on a successful business in the manufacture of carriages, sleighs, etc., has decided to turn the business into a joint stock company to be known as Bill C. Raworth Limited. Application has been made for a New Brunswick charter. The capital will be $49,000.

The Dominion Hardwoods, Limited, of Deseronto, have commenced operations at their big new plant, which represents an investment of about $150,000. The company advise us that they use three carloads of hardwood logs daily, and that when the machinery now under construction is completed it will be the largest handle factory in the world.

The annual "Made in Stratford" furniture exhibit was held in Stratford from January 10 to 20. Practically all of the Stratford factories exhibited, and, as usual, every possible arrangement was made for the convenience and entertainment of buyers. The furniture shown covered a wide range, and the number of buyers present would seem to indicate a good run of business.

C. W. Baxter, of the Dominion Fruit Division, Ottawa, after visiting the prairie provinces and making many inquiries, states that western buyers prefer to have their apples packed in boxes, instead of barrels. In a number of places he was told that if Ontario growers want to sell their apples in the West they **must** pack them in boxes. This should be good news for the box factories.

The town of North Bay, Ont., has granted a free site, and building, to the North Bay Toy Company. The company have obtained a charter and expect to erect a factory as soon as the weather is favorable for putting in the foundation. They will manufacture all kinds of wooden toys and novelties. The provisional directors are L. W. Henderson, G. Gordon, H. H. Thompson, G. W. Duncan, E. Brandon and W. G. Armstrong.

The factory at Wiarton, Ont., belonging to the Canada Furniture Manufacturers Limited, and commonly known as the Wiarton Furniture Factory, was totally destroyed while the factory was in operation, and one employee, P. Alderson, whom it is thought remained in an effort to save his tools, was burned to death. Another employee, John Carroll, was severely burned about the face and head. The fire was supposed to have originated from a hot box. The factory was one of the largest of its kind in Ontario, having 64,000 square feet of floor space. The loss is covered by insurance. The company advises us that they have not as yet reached a decision as to whether they will rebuild or not.

Galbraith & Co., Ltd.
Owen Sound, Ont.
Manufacturers of
"Well-Made" Wood Specialties
Toys, Games, Turned Goods and Kitchenware
We Specialize on
CUSTOMS TURNINGS
Your order will receive prompt attention

FOR SALE!

1 car 2 x 2 —19 in. Clear Oak.
1¾ x 1¾—19 in. Clear Oak.

1 car 2 x 2 —40 in. Clear Maple.

3 cars 1 x 6, 8 and 10 in. Dry Maple, Birch, Cherry, Ash and Oak, 2, 3 and 4 ft. long.

1 car 1 x 1—24 and 48 in. Clear Maple and Birch.

1 car 1 x 1—19 in. Clear K. D. Oak.

1 car 4/4 x 2½ to 5½ in. Clear, Bone Dry Qtd. White Oak Strips, mostly 4 to 5½ ins. wide.

5 cars 1 x 3 in. and up 34, 38, 40, 42 and 48 in. Clear Dry Oak.

1 car 2 x 2—26 in. Clear Dry Ash.
2½ x 2½—25 in. Clear Dry Ash.

2 cars 2 x 2—19 in. and 30 in. Clear Oak.

The above is dry and thoroughly seasoned and shipment can be made promptly

The Probst Lumber Co.
Cincinnati, Ohio

Rexford
Veneer Tapes

Combine all the qualities desired by manufacturers and users of veneers.

"Let a sample roll tell its own story"

Please state your requirements and, if possible, send sample of tape you are now using.

Rexford Gummed Tape Co.
Manufacturers
Home Office, 598 Clinton St., MILWAUKEE, Wis.
St. Louis, Mo. Branch, 416 Rialto Building. Olive 3529
Chicago, Ill., Branch, 20 E. Jackson Blvd. Harrison 6107

- AT YOUR SERVICE -

We submit for your interest the following choice
HARDWOODS:

2 cars 4/4 No. 2 Com. and Bet. Soft Elm.
1 car 6/4 No. 1 Com. and Bet. Soft Elm.
1 car 12/4 No. 1 Com. and Bet. Dry Hard Maple.
2 cars 8/4 No. 2 Com. and Bet. Dry Hard Maple
1 car 4/4 No. 1 Com. and Bet. Black Ash.
2 cars 6/4 No. 2 Com. & Bet. Dry Hard Maple.
15,000 ft. 6/4 No. 1 Com. and Bet. Birch.
1 car 6/4 x 10 and up No. 1 Com. and Bet. Birch.
33,000 ft. 10/4 No. 1 Com. and Bet. Birch.
1 car 4 in. x 6 Sound Birch Hearts.
5 cars 4/4 No. 3 Com. Beech and Maple.
7,000 ft. 16/4 First and Second Hickory.
200 ft. 12/4 No. 1 Com. and Bet. Hickory.
2,500, ft. 8/4 No. 1 Com. and Bet. Hickory.
50,000 ft. 4/4 x 3 Spruce Crating.
50,000 ft. 4/4 x 4 and up Spruce Crating.

All the above stock thoroughly dry and well manufactured

Write, wire or 'phone your inquiries and they will have careful attention

Graves, Bigwood & Co.
Manufacturers
of
PINE
HEMLOCK
HARDWOOD } **LUMBER**
712 Traders Bank Building
TORONTO - ONT.

Mills at—Byng Inlet, Ont.
and
Deer Lake, Ont.

FOR SALE

We can furnish for prompt shipment large quantities of Gum for Bethlehem Shell Box diaphragms and all other kinds of veneers. Robbins Veneer & Lumber Company, Buffalo, N.Y. 1

For Sale—Panel Poplar

1 Car 5/8 in., 7 to 17 in. wide, mostly 12 in. and up
48,000 ft. 5/8 in., 17 to 23 in. wide, 50 per cent. 16 ft. long.
32,000 5/8 in., 24 in. and up wide, 50 per cent. 16 ft. long.
21,000 ft. 3/4 in., 24 in. and up wide, 50 per cent. 16 ft. long.

CHARLES F. SHIELS & CO.,
12-1-2 Cincinnati, Ohio.

Woodworking Plant
for Sale or to Rent

Is thoroughly equipped for all kinds of woodwork manufacture. Situated on three lines of railroad. List of machinery, etc., furnished to interested parties. Terms reasonable. Address Box 24, Canadian Woodworker, 345 Adelaide Street West, Toronto. 12-1

Second-Hand Machines For Sale

We have the following to offer. Ask us about others not listed, if you are interested.

1 Egan	30 in. 2 Drum Sander.
1 McGregor Gourlay	30-in. 2 Drum Boss Sander.
1 Jackson Cochrane	36-in. 3 Drum Sander.
1 Egan	42 in. 3 Drum Sander.
1 Cowan	42-in. 3 Drum Sander.
1 Cowan	48-in. 3 Drum Sander.
1 C. M. C.	8-in. 4 side Sticker.
2 Ballantyne	12-in. 4 side Sticker.
1 Egan	36-in. Single Surfacer.
1 Harper	26-in. Single Surfacer.
1 Cowan No. 220	24 x 10 Single Surfacer.
1 McGregor Gourlay	QY 15-in. Planer & Matcher.
1 McGregor Gourlay	QY 9-in. Planer & Matcher.
1 Jackson Cochrane	54-in. Band Resaw 5-in. blade.
1 Jackson Cochrane	No. 165 Rip Saw.

P. B. Yates Machine Co., Limited
Hamilton, Ontario t-f

Second-Hand Woodworking Machines

Band Saws—26-in., 36-in., 40-in.
Jointers—12-in., 16-in.
Shapers—Single and double spindle.
Re-Saw—42-in. American.
Lathes—20-in. with rests and chisels.
Surfacers—16 x 6 in. and 18 x 8 in.
Mortisers—No. 5 and No. 7 New Britain.
Rip and Cut-off Saws; Molders; Sash Relishers, etc.
Over 100 machines, New and Used, in stock.

Baird Machinery Company,
123 Water Street,
PITTSBURGH, PA.

WANTED

Birch, 2 cars, dry 1 in. unselected Firsts and Seconds; red all in, 50 per cent. 14 and 16 ft.

CHARLES F. SHIELS & CO.,
12-1-2 Cincinnati, Ohio.

Canadian Agents Wanted

We desire to appoint an agent in Canada to handle our enamels, etc. Will give agency for entire Dominion or for Provinces, as desired. Write in first instance to Box 25, "Canadian Woodworker and Furniture Manufacturer," Toronto. 12-1

For Sale

One No. 2 Reynolds Standard Automatic Screw Driving Machine with 5-in. extension and with attachments for screws 3/4 in. No. 10 to 1 3/4 in. No. 14.

Also one Upright 5 Spindle Drill with 3 Sets of Bits, five in a set, for boring diaphragms in the Bethlehem Fixed Ammunition Boxes.

Both machines are as good as new, being used for one contract only, and will be sold at reasonable prices.

The Paget Grain Door Co., Ltd.,
1 Goderich, Ont.

British Timber and the War

We have been visiting several of the Canadian and other camps where home-grown timber is being felled and converted, and must certainly say that the work, generally speaking, is being carried out in a practical and businesslike manner. What surprised us most at every felling station was the quality of timber being dealt with, much of that at Windsor, the Scotch fir in particular, being quite as large and of equally good quality to any that has been sent from abroad, a fact that was freely commented on by several managers of woodlands with whom we were in company. Some very fine timber is being cut from the hillsides above Gwydyr Castle, in Wales, the larch especially being remarkably clean, of great length, and the timber first-class in quality. Whole plantations are here being swept away, and the visitor after the war will find a sadly changed landscape away amongst these Welsh hills that he loved so well. But the exigencies of the war know no bounds. In the New Forest the Portuguese tree-fellers, some 26 in number, are doing useful work, and the rapidity with which the trees are felled and prepared for use is simply marvellous. They seem to be an industrious lot, working from dawn to dark, and evidently subsisting on what the English tree-feller would consider as meagre fare.—Timber News.

WATCHMAN'S CLOCKS
Hardinge Portable
The only unlimited System.
Patrol clock, each $39.60 complete.
Stations, any number needed $4.10.
Also Key Type Clocks, limited capacity.
F.O.B. Toronto. Write for catalogues.
Signal Systems Co., 110 Church St., Toronto

PETRIE'S
MONTHLY LIST
of
NEW and USED
WOOD TOOLS
in stock for immediate delivery

Wood Planers
30" Whitney pattern surfacer.
26" Revolving bed single surfacer.
26" Revolving bed double surfacers.
24" Major Harper planer and matcher.
24" Dundas surface planer.
24" Single surfacers, various makes.
22" Stationary bed surface planer.

Band Saws
42" Fay & Egan power feed rip.
38" Atlantic tilting frame.
30" Ideal pedestal, tilting table.

Saw Tables
Ballantine variable power feed.
Preston variable power feed.
Cowan heavy power feed, M138.
No. 3 Crescent universal.
No. 2 Crescent combination.
Ideal variety, tilting table.
12' Defiance automatic equalizer.
MacGregor Gourlay railway cut-off.
7½' Iron frame swing.

Mortisers
Cowan hollow chisel, M190.
Galt upright, compound table.
No. 2 Smart foot power.
No. 1 Smart foot power.

Moulders
13" Clark-Demill four-side.
12" Cowan four side.
10" Houston four side.
6" Cowan four side.
6" Dundas sash sticker.

Sanders
24" Fay double drum.
12" C.M.C. disk and drum.
18" Crescent disk, adjustable table.

Clothespin Machinery
Humphrey No. 8 giant slab resaw.
Humphrey gang slitter.
Humphrey cylinder cutting-off machine.
Humphrey automatic lathes (6).
Humphrey double slotters (4).

Miscellaneous
Fay & Egan 12 spindle dovetailer.
MacGregor Gourlay 12 spindle dovetailer.
Cowan dowel machine, M80.
Cowan post boring machine, M85G.
Cowan post boring machine, M23.
Elliott single spindle shaper.
Rogers vertical resaw.
Cowan sash clamp.
Egan sash and door tenoner.
No. 6 Lion universal woodtrimmer.
6 nail box nailer, Meyers patent.
20" American wood scraper.
16" Ideal wood lathes (3).
4-head rounding machines.
Cowan spindle carver, M63.
Cowan veneer press screws.
Dunbar horizontal automatic shingle machine.

Prices, Descriptions and Full Particulars on Request

H. W. PETRIE, LTD.
Front St. W., Toronto, Ont.

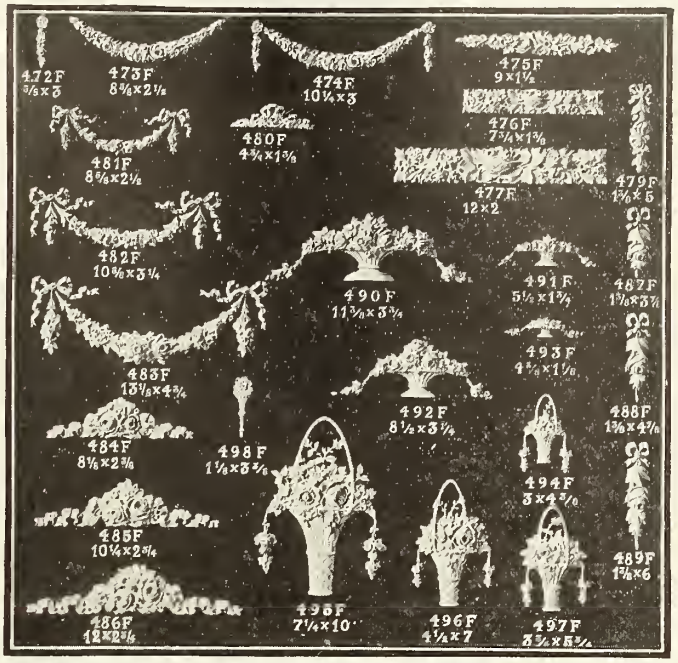
CARVINGS FOR PERIOD FURNITURE

Composition Carvings

are now extensively used for furniture decorations.

This is a material that will interest all manufacturers of furniture.

Write for Catalog and prices.



Most durable and practical Carvings on the market.

We have thousands of stock designs in all the different styles; can also manufacture according to your special designs.

Samples sent on request.

THE DECORATORS SUPPLY CO., 2551 Archer Ave., Chicago, Ill.

Buy Something Worth While

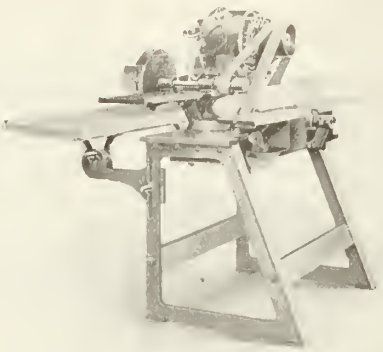
—Don't be Influenced by Low Prices or a Coat of Paint

Andrew's 12-ft. double-column borer, 12 heads.
Andrew's 30-in. 3-spindle vertical borer, practically new.
Andrew's single spindle vertical borer, practically new.
Band rip saw, Fay & Egan, 42 in.
Band resaw, Fay & Egan, 60 in.
Band saws, 32, 36, and 38 in.
Glue cookers and retainers. Glue spreaders.
Jointers, 12, 16, 20, and 24 in.
Lathes, Mattison, Nos. 7 and 8, automatic.
Matcher, American Northwest, 24 x 8 in.
Matchers, 24 x 6 in., 3 and 4 sides.
Molders, inside, 13 in., American and Woods.
Molders, 4 side, 9, 10, and 12 in., American.
Molder, Smith latest, 9-in. No. 107-A.
Mortiser and router, Fay & Egan No. 124.
Mortiser, chain saw No. 7, New Britain Mach. Co., six chains.
Rip saw, Greenlee self-feed, heavy, No. 426.
Sanders, 42-in. Columbia, 24 and 30-in. Fay & Egan double.
Saws, combination and variety, tilting table.
Surfacers, American 4½, 36-in. sectional roll and chip-breaker; Whitney 30-in. single sectional roll; 36-in. solid roll; Fay & Egan No. 140 double, 27 and 30 in. divided roll.. Single, 16 in., 18 in., 20 in., 24 in., 26 in., 30 in.
Shapers, Smith's latest, double and single; also Shimer single, with overhead routing arm.
Tenoners, Fay & Egan double end, 8 ft. long, D. H. & D. C.; also several single end.
Timber sizer, Woods 30 x 10, divided rolls.
Veneer jointer, Veneer Machinery Co. make.
Window frame machines, Phillips and Smith & Phillips.
Wood-workers, universal, Fay & Egan 10½ in. and Bentel & Margedant No. 4, 9 in.; also extra heavy Bentel & Margedant 12-in. machine for extra heavy work.

The Osborne & Sexton Machinery Co.

Re-Manufacturers COLUMBUS, OHIO

"Solving the Labor Problem"

1 man +  = 4 men

Pat. 1914-15

The ELLIOT WOODWORKER does it

This machine has proven its worth and saved its cost over and over again in many of the largest woodworking plants in Canada.

With scarcely any trouble at all it may be moved from one place to another, upstairs, out in the lumber yard, back at the boilers, over in an obscure corner where no other machine could be used, in fact it is really portable in every sense of the word. It is equipped with a powerful motor and can be placed anywhere in your shop or in the yard.

Many are the things you can do with this wonderful machine—cross cut, mitre, house-out, rout-out, rip, groove, bore, make stairs, doors, strings, jambs, etc., and every day it is in use a new operation will be found for it.

Our illustrated circular fully describes it, and we will mail you a copy free for the asking; also prices and terms.

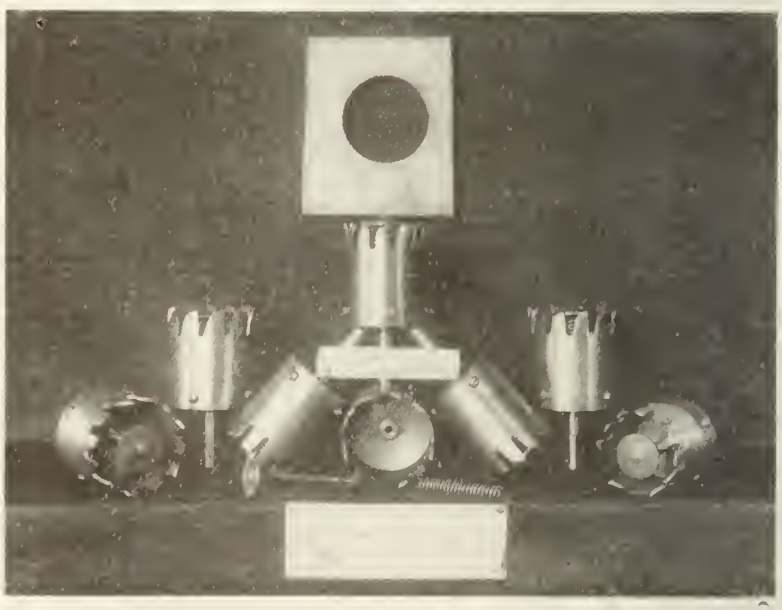
THE ELLIOT WOODWORKER, LIMITED

480 Bathurst Street, **Toronto, Ont.** Corner Brush and Congress Sts., **Detroit, Mich.**

"BEAVER" Cylinder Saws for "Bethlehem" Shell Box Diaphragms

These Saws will cut straight holes in veneer diaphragms rapidly and without tearing the different plys asunder. They can be set and filed as any ordinary saw, thus holding their clearance and size. Our latest type saw is fitted with new style core ejector. This kicker bears on exact centre of wood eliminating all friction.

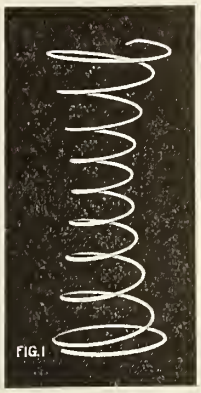
We also supply special cutter heads for taper nose blocks in 4.5″ and 18 P. R. Shell Boxes.



RADCLIFF SAW MFG. CO., LIMITED

550 DUNDAS ST.
TORONTO, ONT.

Agents for L. & I. J. White Co., Machine Knives



HIGH GRADE SPRINGS

for all kinds of Upholstery Work

Constructions for Chairs, Davenports, Carriages and Automobiles.

"Fosters" Multi-Springs and Luxury Springs

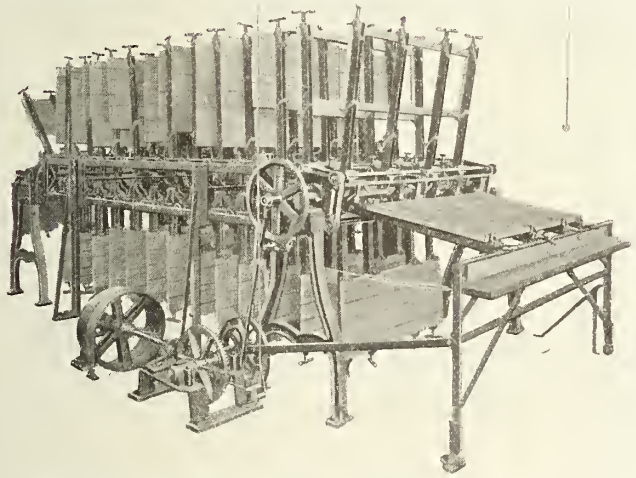
Spring Filling for Top Cushions

The service resulting from 30 years' experience is at your command.

We solicit your inquiries and an opportunity to submit samples.

FOSTER BROS. MFG. CO., Utica, N.Y., U.S.A.

Billstrom
Glue Clamp Carrier



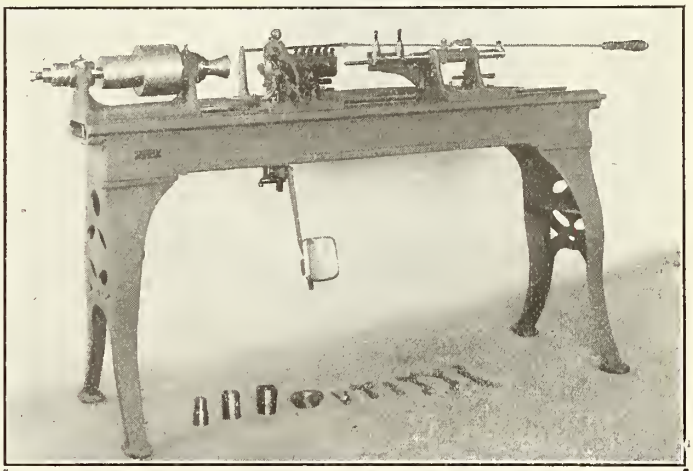
Here is a machine that will effect great savings in any plant where glued-up stock is handled.

It holds the edge glued stock securely until the glue is set. A glance at the above illustration tells the story.

ASK FOR LIST OF USERS.

Nels J. Billstrom, 2002 Ninth Street, ROCKFORD, ILL.

R. S. Pollard, Preston, Ont.



Cut the Cost of Production

by using the

WAYMOTH VARIETY WOOD-TURNING LATHE

Every feature incorporated in the lathe which makes for a little saving in the time of the operator, every item for his convenience that enables him to do better and more rapid work, assures just that much better service to the owner.

We would like to tell you about three special features of this lathe

Our lathes are sold in Canada by

A. R. Williams Machinery Co., Toronto, Vancouver and Winnipeg.
General Supply Company of Canada, Ottawa.
Williams & Wilson, Montreal.

A. D. WAYMOTH & CO., FITCHBURG, MASS.

Established in 1845.

DARLINGS STEAM APPLIANCES

DARLING BROTHERS
LIMITED
Engineers and Manufacturers
MONTREAL, CANADA

Branches: Toronto and Winnipeg
Agents: Halifax, St. John, Calgary, Vancouver

Crating Lumber

5/8" and 1" All Grades
At Right Prices

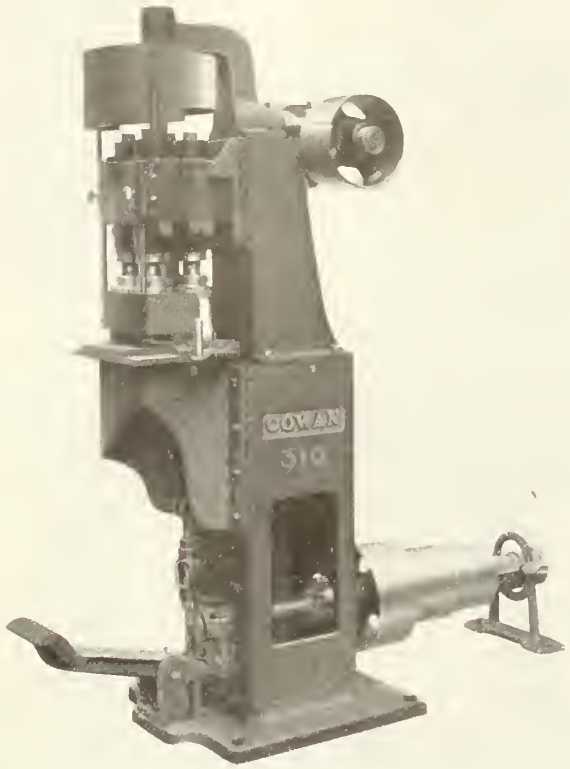
Try Us—It will be worth your while.

Read Bros., Limited

43 Victoria Street

Toronto -:- **Canada**

New Vertical Five Spindle Boring Machine 310



Reduce your Cost in boring diaphragms for Bethlehem boxes by getting a Vertical Borer.

The machine is substantially built, made to stand up to the work. The spindles are of high carbon steel running in bronze bearings, with bronze thrust collar. Gears cut from the solid steel. This machine will bore 3000 diaphragms per day.

Write for full description and price.

COWAN & COMPANY OF GALT
LIMITED
Manufacturers of Wood Working Machinery
GALT, ONT., CANADA

Perkins Vegetable Glue

The Best for Built-up Stock and Veneer Laying

Dinner wagon manufactured by the D. Hibner Furniture Co., Limited, Kitchener, Ont., in which Perkins Glue was used.

Perkins Vegetable Glue sticks and holds. It is unaffected by dampness, extremely dry atmosphere or severe sanding. We guarantee to effect a 20 per cent. saving in your glue room by replacing hide glue with Perkins Vegetable Glue. Along with this saving you can have a glue room comfortable as to temperature and sweet as to smell. The glue is absolutely uniform in quality. Every shipment exactly the same. Let us demonstrate in your own factory and on your own stock just what can be accomplished with Perkins Vegetable Glue.

PERKINS GLUE COMPANY, LIMITED, HAMILTON, ONT.

"Address all inquiries to Sales Office, Perkins Glue Company, South Bend, Indiana, U. S. A."

FROST KING *"The Standard for Forty Years"* TROJAN

The Dependable Babbitt

Equally as good for heavy duty as speed. It is especially adapted for manufacturers of woodworking machinery, planing mills, furniture factories, box factories and woodworking plants.

Try it

Our High Grade Babbitt

Owing to its phenomenal ability to absorb oil "Trojan" babbitt will be found ideal for overhead bearings in line and counter-shafts as it is unnecessary to oil as often as with the ordinary babbitts.

Try it

HOYT METAL COMPANY - Toronto, Ont.

NEW YORK ST. LOUIS LONDON, ENG.

You Have Paid for an Installation of

Chapman Double Ball Bearings

in Your Factory over and over again, BUT—

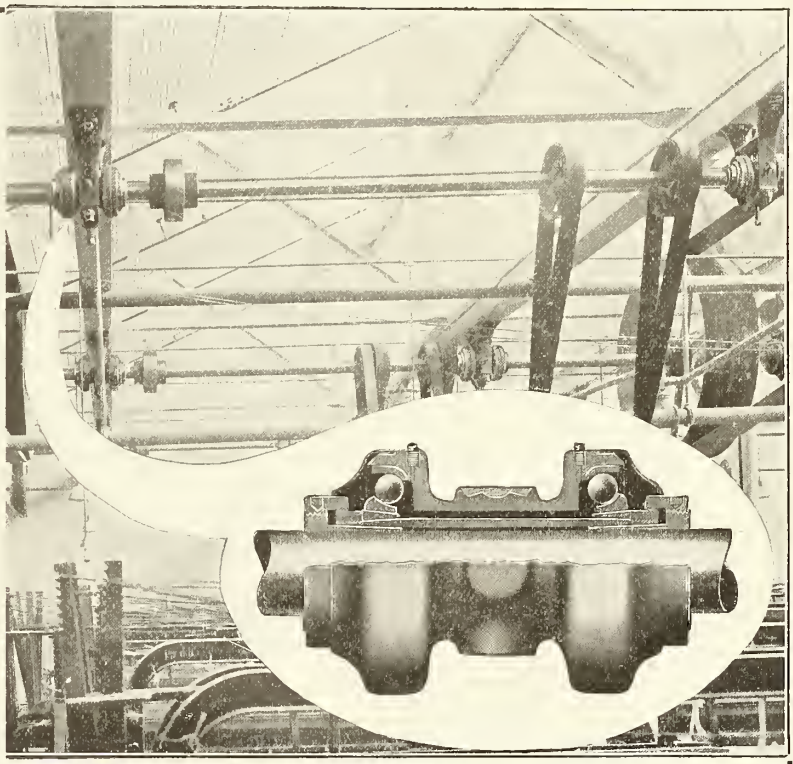
HAVE YOU GOT THEM ?

Ordinary line shafting wastes from 15 per cent. to 60 per cent. of power.

Line shafting equipped with Chapman Double Ball Bearings will eliminate about 75 per cent. of the friction, thus averaging a total saving of from 15 per cent. to 30 per cent.

Chapman Double Ball Bearings fit any adjustable hanger and require oiling and attention only once a year. No extra equipment required to install.

Write to-day for full particulars.



The Chapman Double Ball Bearing Co. of Canada, Limited

Toronto 339-351 Sorauren Ave. Ontario

American Branch: The Transmission Ball Bearing Co., Inc., 32 Wells St., Buffalo, N. Y.

BOOKS FOR SALE

The following books are offered at special prices subject to previous sale:

Carpentry and Joinery, by Gilbert Townsend. Published in 1913 by the American School of Correspondence. 258 pages, illustrated. Price $1.00.

Saw Fitting Manual, a treatise on the care of saws and knives. Deals with everything in the saw and knife alphabet, from adjustments to widths. 144 pages. Price $2.00.

Common-sense Handrailing, by Fred T. Hodgson. Published by Frederick J. Drake & Company, Chicago. 114 pages, illustrated. Price 50c.

Roof Framing Made Easy, by Owen B. Maginnis. Published by The Industrial Publication Company, New York. 164 pages, illustrated. Price 50c.

Handrailing Simplified, by An Experienced Architect. Published by William T. Comstock, New York. 52 pages, illustrated. Price 50c.

How to Join Mouldings; or, The Arts of Mitering and Coping, by Owen B. Maginnis. Published by William T. Comstock, New York. 72 pages, illustrated. Price 50c.

Cabinet Making, by J. H. Rudd. Published by Grand Rapids Furniture Record Company. 210 pages, illustrated. Price $1.50.

Utilization of Wood-Waste (Second Revised Edition), by Ernst Hubbard. Published in 1915 by Scott, Greenwood & Sons. 192 pages, illustrated. Price $1.50.

Woodworker Publishing Company, Limited

345 Adelaide Street West, Toronto, Ontario

The "Canadian Woodworker" Buyers' Directory

An Index to the Best Equipment and Supplies

ABRASIVES
The Carborundum Co., Niagara Falls, N.Y.

AIR BRUSH EQUIPMENT
DeVilbiss Mfg. Co., Toledo, Ohio.

ANNUNCIATORS
Signal Systems Company, Toronto, Ont.

BABBITT METAL
Hoyt Metal Co., Toronto.

BALL BEARINGS
Chapman Double Ball Bearing Co., Toronto.

BALUSTER LATHES
Garlock-Walker Machinery Co., Toronto, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.

BAND SAW FILING MACHINERY
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

BAND SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

BAND SAW MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

BAND SAW STRETCHERS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Yates Machine Co., P. B., Hamilton, Ont.

BENDING MACHINES
Defiance Machine Works, Defiance, Ohio.
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Garlock-Walker Machinery Co., Toronto, Ont.
Perfection Wood Steaming Retort Company, Parkersburg, W. Va.

BELLS, ELECTRIC
Signal Systems Company, Toronto, Ont.

BELTING
Fay & Egan Co., J. A., Cincinnati, Ohio.

BLOWERS
Sheldons, Limited, Galt, Ont.

BLOW PIPING
Sheldons, Limited, Galt, Ont.

BORING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Nash, J. M., Milwaukee, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Reynolds Pattern & Machine Co., Moline, Ill.
Yates Machine Co., P. B., Hamilton, Ont.

BOX MAKERS' MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Neilson & Company, J. L., Winnipeg, Man.
Preston Woodworking Machinery Company, Preston, Ont.
Reynolds Pattern & Machine Co., Moline, Ill.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

BRUSHES
Skedden Brush Co., Hamilton, Ont.

CABINET PLANERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

CARS (Transfer)
Sheldons, Limited, Galt, Ont.

CARBORUNDUM PAPER
Carborundum Co., Niagara Falls, N.Y.

CARVING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

CASTERS
Burns & Bassick Co., Bridgeport, Conn.
Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.

CLAMPS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Neilson & Company, J. L., Winnipeg, Man.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Company, Montreal, P.Q.

COLUMN MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

CORRUGATED FASTENERS
Acme Steel Goods Company of Canada, Ltd.

CRATING LUMBER
Read Bros., Limited, Toronto.

CUSTOMS TURNINGS
Galbraith & Co., Ltd., Owen Sound, Ont.

CUT-OFF SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, Que.
Yates Machine Co., P. B., Hamilton, Ont.

CUTTER HEADS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, Beloit, Wis.
Shimer Cutter Head Co., Galt, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

DOVETAILING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

DOWEL MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

DRY KILNS
Grand Rapids Veneer Works, Grand Rapids, Mich.
National Dry Kiln Co., Indianapolis, Ind.
Sheldons, Limited, Galt, Ont.

DUST COLLECTORS
Sheldons, Limited, Galt, Ont.

DUST SEPARATORS
Sheldons, Limited, Galt, Ont.

EDGERS (Single Saw)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont
Simonds Canada Saw Co., Montreal, Que.

EDGERS (Gang)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

END MATCHING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

EXHAUST FANS
Garlock-Walker Machinery Co., Toronto, Ont.
Sheldons Limited, Galt, Ont.

FILES
Simonds Canada Saw Co., Montreal, Que.

FLOORING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

FLUTING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.

FLUTING AND TWIST MACHINE
Preston Woodworking Machinery Company, Preston, Ont.

FURNITURE CARVINGS
Decorators Supply Co., Chicago, Ill.

FURNITURE TRIMMINGS
Burns & Bassick Co., Bridgeport, Conn.
Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.

GARNET PAPER AND CLOTH
The Carborundum Co., Niagara Falls, N.Y.
Ritchey Supply Company, Toronto, Ont.

GRAINING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Yates Machine Co., P. B., Hamilton, Ont.

GLUE
Perkins Glue Company, South Bend, Ind.

GLUE CLAMPS
Jackson, Cochrane & Company, Kitchener, Ont.
Neilson & Company, J. L., Winnipeg.

GLUE HEATERS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Kitchener, Ont.

GLUE JOINTERS
Canada Machinery Corporation, Galt, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

GLUE SPREADERS
Fay & Egan Co., J. A., Cincinnati, Ohio
Jackson, Cochrane & Company, Kitchener, Ont.

GLUE ROOM EQUIPMENT
Billstrom, Nels. J., Rockford, Ill.
Perrin & Company, W. R., Toronto, Ont.

GRINDERS (Cutter)
Fay & Egan Co., J. A., Cincinnati, Ohio.

GRINDERS, HAND AND FOOT POWER
The Carborundum Co., Niagara Falls, N.Y.

GRINDERS (Knife)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

GRINDERS (Tool)
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Kitchener, Ont

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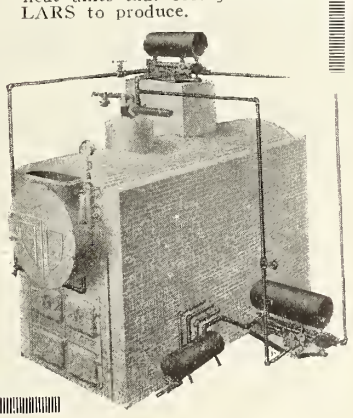

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GRAND RAPIDS MICHIGAN

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"Canadian Woodworker" Buyers' Directory—Continued

GRINDING WHEELS
The Carborundum Co., Niagara Falls, N.Y.

GROOVING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.

GUM LUMBER
Anderson-Tully Co., Memphis, Tenn.
Brown & Co., George C., Memphis, Tenn.
Churchill Milton Lumber Co., Louisville, Ky.
Lamb-Fish Lumber Co., Charlestown, Miss.
Penrod, Jurden & McCowen, Memphis, Tenn.

GUMMERS, ETC.
Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND PROTECTORS
Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND SCREWS
Fay & Egan Co., J. A., Cincinnati, Ohio.

HANDLE & SPOKE MACHINERY
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Whitney & Son, Baxter D., Winchendon, Mass.

HARDWARE
Burns & Bassick Co., Bridgeport, Conn.
Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.
Weber-Knapp Co., Jamestown, N.Y.

HARDWOOD LUMBER
Aberdeen Lumber Co., Pittsburg, Pa.
Anderson-Tully Co., Memphis, Tenn.
American Hardwood Lumber Co., St. Louis, Mo.
Atlantic Lumber Company, Toronto.
Banning, Leland G., Cincinnati, Ohio.
Brown & Company, Geo. C., Memphis, Tenn.
Burns & Knapp Lumber Co., Conneautville, Pa.
Churchill-Milton Lumber Co., Louisville, Ky.
Clark & Son, Edward, Toronto, Ont.
Dermott Land & Lumber Co., Chicago, Ill.
Farrin Lumber Co., M. B., Cincinnati, Ohio.
Graves, Bigwood Company, Toronto, Ont.
Kersley, Geo., Montreal, Que.
Korn-Conkling Co., Cincinnati, Ohio.
Lamb-Fish Lumber Co., Charlestown, Miss.
Martin-Barriss Co., Cleveland, Ohio.
Mowbray & Robinson, Cincinnati, Ohio.
Paepcke Leicht Lumber Co., Chicago, Ill.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Pickrel Walnut Co., St. Louis, Mo.
Probst Lumber Co., Cincinnati, Ohio.
Read Bros., Limited, Toronto.
Shafer Lumber Co., Cyrus C., South Bend, Ind.
Spencer, C. A., Montreal, Que.

HUB MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
Perrin & Company, Wm. R., Toronto, Ont.

JOINTERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

KNIVES (Planer and others)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

LATHES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Defiance Machine Works.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.

LUMBER
Aberdeen Lumber Co., Pittsburg, Pa.
Acme Veneer & Lumber Co., Cincinnati, Ohio.
American Hardwood Lumber Co., St. Louis, Mo.
Anderson-Tully Co., Memphis, Tenn.
Banning, Leland G., Cincinnati, Ohio.
B. C. Lumber Commissioner, Toronto.
Brown & Company, Geo. C., Memphis, Tenn.
Churchill, Milton Lumber Co., Louisville, Ky.
Clark & Son, Edward, Toronto, Ont.
Dermott Land & Lumber Co., Chicago, Ill.
Dominion Mahogany & Veneer Co., Montreal,
Farrin Lumber Co., M. B., Cincinnati, Ohio.
Graves, Bigwood Company, Toronto, Ont.
Hartzell, Geo. W., Piqua, Ohio.
Huddleston, Marsh Mahogany Co., New York.
Long-Knight Lumber Co., Indianapolis.
Paepcke Leicht Lumber Company, Chicago, Ill.
Pickrel Walnut Co., St. Louis, Mo.
Probst Lumber Co., Cincinnati, Ohio.
Read Bros., Limited, Toronto.
Shafer Lumber Co., Cyrus C., South Bend, Ind.
Stimson & Co., J. V., Owensboro, Ky.

MACHINE KNIVES
Canada Machinery Corporation, Galt, Ont.
Peter Hay Knife Company, Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

MITRE MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

MITRE SAWS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Simonds Canada Saw Co., Montreal, P.Q.

MULTIPLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Reynolds Pattern & Machine Co., Moline, Ill.

PANELS
Waetjen & Co., George L., Milwaukee, Wis.

PATTERN SHOP MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PLANERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PLANING MILL MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PRESSES (Veneer)
Canada Machinery Corporation, Galt, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Perrin & Co., Wm. R., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.

PULLEYS
Fay & Egan Co., J. A., Cincinnati, Ohio.

RED GUM LUMBER
Gum Lumber Manufacturers' Association.

RESAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

RIM AND FELLOE MACHINERY
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.

RIP SAWING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SANDERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Nash, J. M., Milwaukee, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SASH, DOOR & BLIND MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SAWS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Radcliff Saw Mfg. Company, Toronto, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Smith Co., Ltd., R. H., St. Catharines, Ont.

SAW GUMMERS, ALOXITE
The Carborundum Co., Niagara Falls, N.Y.

SAW SWAGES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, Que.

SAW TABLES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SCRAPING MACHINES
Canada Machinery Corporation, Galt, Ont.
Garlock Walker Machinery Co., Toronto, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass

SCREW DRIVING MACHINERY
Canada Machinery Corporation, Galt, Ont.
Reynolds Pattern & Machine Works, Moline, Ill

SCROLL SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

SECOND-HAND MACHINERY
Cowan & Co., Galt, Ont.
Osborne & Sexton Machinery Co., Columbus, Ohio.
Petrie, H. W.

SHAPERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Whitney & Sons, Baxter D., Winchendon, Mass
Yates Machine Co., P. B., Hamilton, Ont.

SHARPENING TOOLS
The Carborundum Co., Niagara Falls, N.Y.

SHAVING COLLECTORS
Sheldons Limited, Galt, Ont.

SHOOK BUNDLER
Neilson & Company, J. L. Winnipeg, Man.

SPRINGS FOR UPHOLSTERY
Foster Bros. Mfg. Co., Utica, N.Y.

STAINS
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

STEAM APPLIANCES
Darling Bros., Montreal.

SINGLE SPINDLE BOXING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.

STAVE SAWING MACHINE
Whitney & Sons, Baxter D., Winchendon, Mass

STEAM TRAPS
Canadian Morehead Mfg. Co., Woodstock, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

STEEL BOX STRAPPING
Acme Steel Goods Co. of Canada, Ltd.

STEEL SHELL BOX BANDS
Acme Steel Goods Co. of Canada, Ltd.

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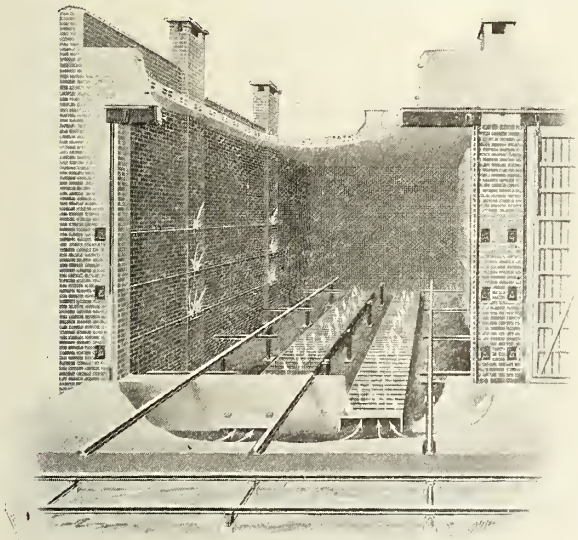

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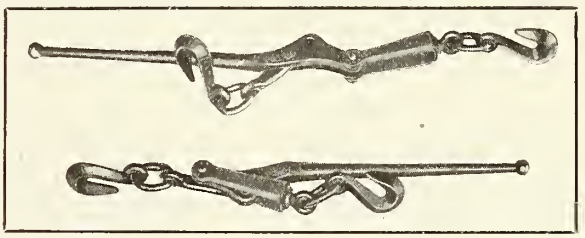

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DIVERGENT SAW EDGE

"Canadian Woodworker" Buyers' Directory—Continued

SURFACERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

SWING SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

TABLE LEG LATHES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

TABLE SLIDES
Walter & Co., B., Wabash, Ind.

TENONING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

RECORDERS (TIME)
Signal Systems Company, Toronto, Ont.

TRANSMISSION MACHINERY
Dodge Mfg. Co., Ltd., Toronto, Ont.

TELEPHONES—PRIVATE SYSTEMS
Signal Systems Company, Toronto, Ont.

TRIMMERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

TRUCKS
Sheldons Limited, Galt, Ont.
National Dry Kiln Co., Indianapolis, Ind.

TURNING MACHINES
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

UNDER-CUT SELF-FEEDING FACE PLANER
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

VARNISHES
Ault & Wiborg Company, Toronto, Ont.

VARNISH SPRAYERS
DeVilbiss Mfg. Co., Toledo, Ohio.

VENEERS
Acme Veneer & Lumber Co., Cincinnati, Ohio.
Barnaby, Chas. A., Greencastle, Ind.
Central Veneer Co., Huntington, W. Virginia.
Dominion Mahogany & Veneer Company, Montreal, Que.
Walter Clark Veneer Co., Grand Rapids, Mich.
Gorham Bros. Co., Mt. Pleasant, Mich.
Hartzell, Geo. W., Piqua, Ohio.
Haughton Veneer Company, Chicago, Ill.
Hay & Company, Woodstock, Ont.
Hoffman Bros. Company, Fort Wayne, Ind.
Geo. Kersley, Montreal, Que.
Nartzik, J. J., Chicago, Ill.
Ohio Veneer Company, Cincinnati, Ohio.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Roberts Veneer Co., New Albany, Ind.
Toronto Veneer Company, Toronto, Ont.
Waetjen & Co., George L., Milwaukee, Wis.

VENEER TAPE
Ideal Coated Paper Co., Brookfield, Mass.
Rexford Gummed Tape Co., Milwaukee, Wis.

VENTILATING APPARATUS
Sheldons Limited, Galt, Ont.

VENEERED PANELS
Hay & Company, Woodstock, Ont.

VENEER PRESSES (Hand and Power)
Canada Machinery Corporation, Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Perrin & Company, Wm. R., Toronto, Ont.

VISES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Company, Montreal, Que.

WAGON AND CARRIAGE MACHINERY
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

WATCHMAN'S CLOCKS
Signal Systems Company, Toronto, Ont.

WOOD FINISHES
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

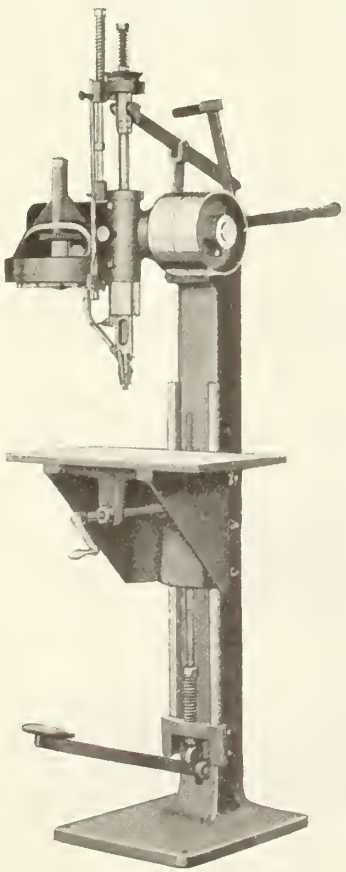
WOOD PULLEYS
Dodge Mfg. Co., Ltd., Toronto, Ont.

WOOD TURNING MACHINERY
Canada Machinery Corporation, Galt, Ont.
Defiance Machine Works, Defiance, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Waymoth & Co., A. D., Fitchburg, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

WORK BENCHES
Fay & Egan Co., J. A., Cincinnati, Ohio.

WOODWORKING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Elliot Woodworker Limited, Toronto, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Reynolds Pattern & Machine Works, Moline, Ill.

WHEELS, Grinding, Carborundum and Aloxite
The Carborundum Co., Niagara Falls, N.Y.



No. 2 Standard Type Automatic Screw-driving Machine.

The Only Way to Drive Screws

There is a stage-coach method and a modern method of doing everything. When it comes to driving screws the only modern way is with an Automatic Screw Driving Machine, which means greater and better production and greater profit.

The Reynolds Automatic Screw-Driving Machine

is guaranteed to produce results. It is no experiment. The No. 2 Standard Type, shown herewith, is particularly suited for placing the screws in the straps of shrapnel boxes. It may be fitted to drive, without change or adjustment, any three consecutive sizes flat or round head, or two sizes filister head, No. 6 to 14 inclusive, wood or machine screws, or three sizes flat or round head, or two sizes filister head machine screws up to No. 20. All the above up to 1½ inches long if smaller than No. 10, or up to 1¾ inches long, No. 10 or larger. Fitted with boring attachment if desired.

Many Machines in Use in Canada.

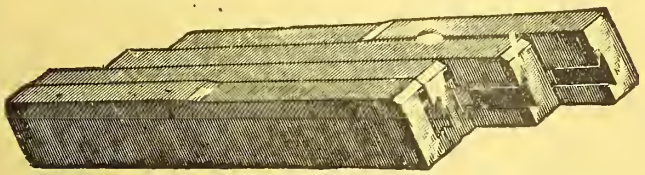
Ask for our Catalogue.

REYNOLDS PATTERN & MACHINE CO.

101 and 103 Third Ave., Moline, Ill., U.S.A.

Making TABLE-SLIDES is a Specialty Business

For more than TWENTY-FIVE YEARS we have made TABLE SLIDES exclusively. Our Factory is equipped with Special Machinery which enables us to make SLIDES,—BETTER and CHEAPER than the furniture manufacturer.



Canadian Table makers are rapidly adopting WABASH SLIDES

Because { They ELIMINATE SLIDE TROUBLES / Are CHEAPER and BETTER

Reduced Costs / **Increased Out-put** { BY USING **WABASH SLIDES**

MADE BY

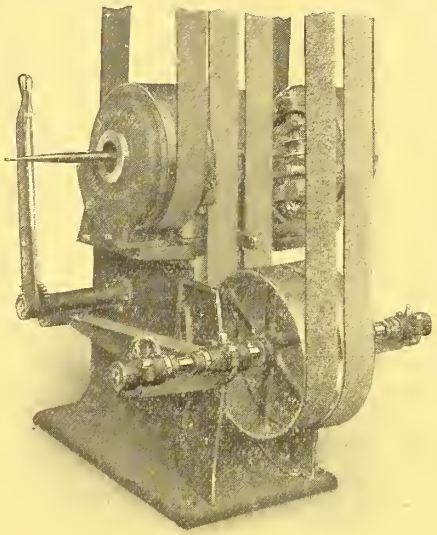
B. Walter & Company

Wabash, Ind.

The Largest EXCLUSIVE TABLE-SLIDE Manufacturers in America

ESTABLISHED-1887

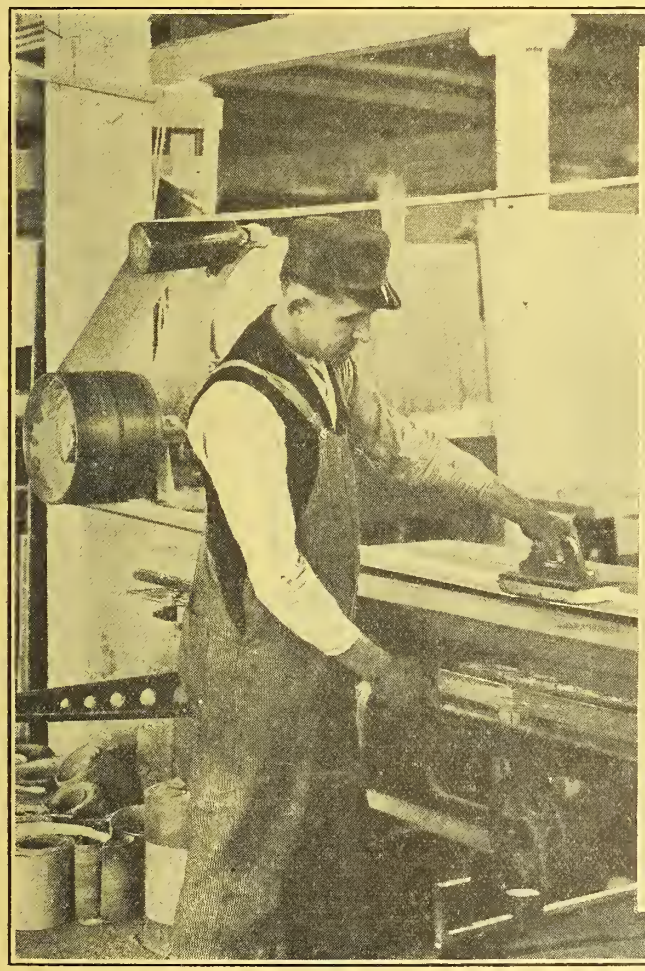
ARE YOU INTERESTED



in a Saving of $3.00 to $4.00 a day?

If you are, ask me about the No. 5 Sander for plain, swelled or taper round work.

J. M. NASH, MILWAUKEE, Wis.



Carborundum Brand Garnet Paper and Cloth are Uniformly Graded—Absolutely so

YOU can always depend upon Carborundum Brand Garnet products—they are uniformly coated with uniformly graded North River Garnet. ¶There is never any coarse grain to leave heavy deep scratches on the work. The paper or cloth will not fill because it is uniformly coated with free, clean cutting grain.

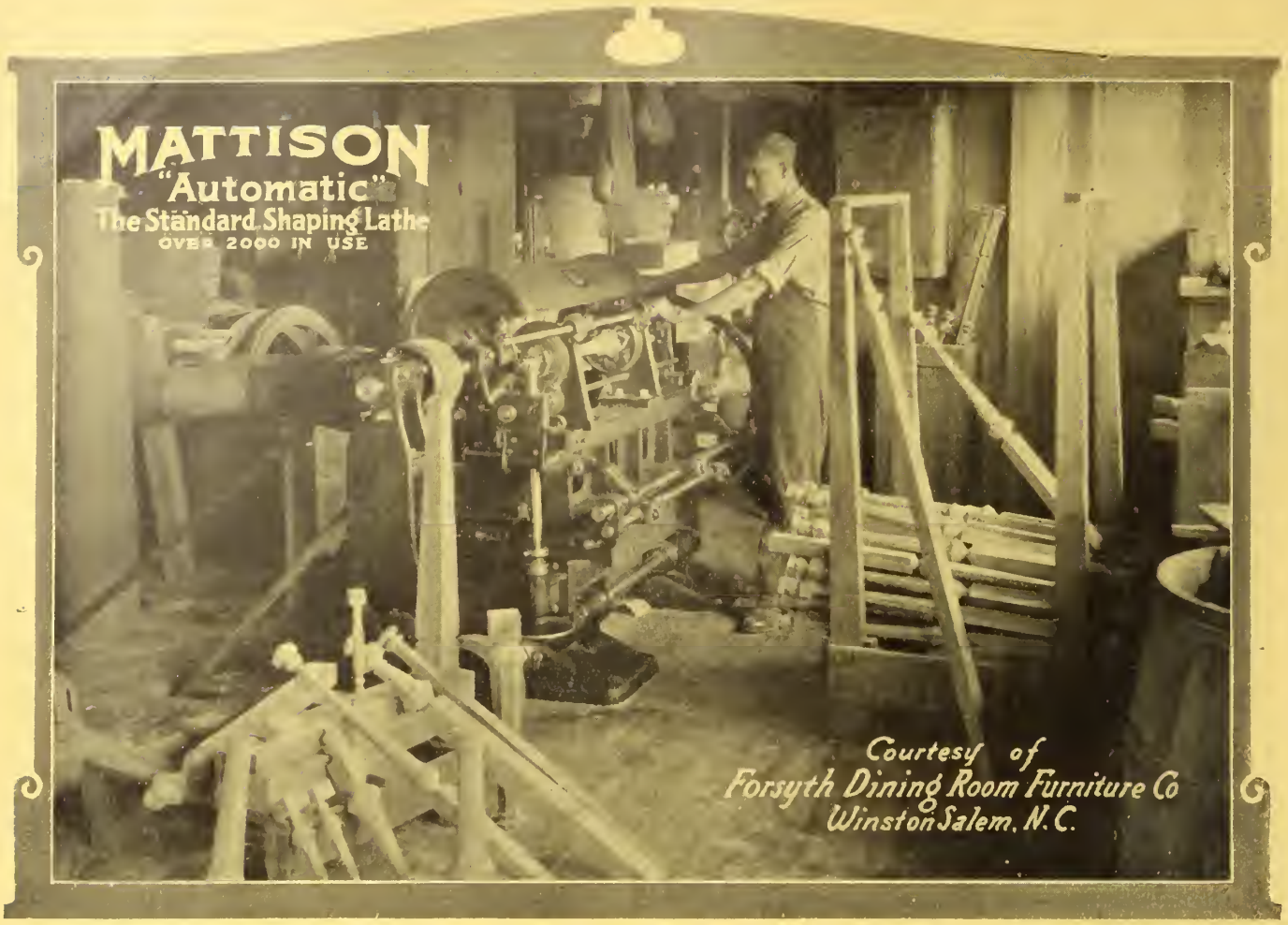
Carborundum Brand Garnet Products are Uniform—Absolutely so

May we send you sample sheets for trial?

THE CARBORUNDUM COMPANY

NIAGARA FALLS, N. Y.

NEW YORK CHICAGO PHILADELPHIA BOSTON CLEVELAND CINCINNATI PITTSBURGH GRAND RAPIDS MILWAUKEE



The above installation shows the versatility of the Mattison Automatic. Over 2,000 such plants are shaping their rounds, squares, ovals, and octagons by this standard method.

Its ability to economically handle the new Queen Anne designs proves its permanent worth in handling new and changing styles. (It's a puttery job to whittle out Queen Anne legs by hand.)

A proven success—not an experiment

EVERY Mattison Lathe turned out to-day is built upon long experience. The present model has come through a long period of development and refinement until it is to-day the standard turning method, a proven success; and is recognized as such in every furniture manufacturing centre. When you buy a Mattison Lathe you get a proven success.

The Mattison Automatic Shaping Lathe is built just as good as expert mechanics can make it. Every phase of the turning problem has been studied exhaustively, and the knowledge thus gained has provided the furniture industry with a turning and shaping equipment that is absolutely practical.

It's purpose is to conserve labor, to reduce turning costs, and to provide a method of permanent value to every one of its users. The fact that it is recommended by 99 out of 100 furniture workers is final evidence of its success.

Investigate this standard method, and find out what service our experience can give you.

No Other Shaping Lathe Like the Mattison

IT IS BUILT ONLY BY

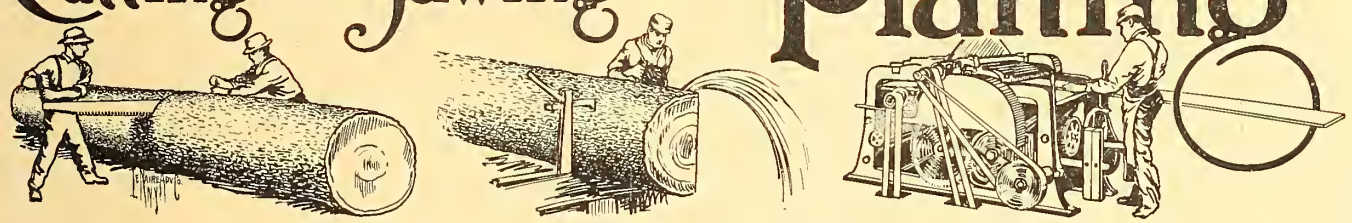
C. Mattison Machine Works

883 Fifth Street Beloit, Wisconsin, U. S. A.

Volume Seventeen TORONTO, FEBRUARY, 1917 Number Two

CANADIAN
WOODWORKER
and
Furniture Manufacturer

Cutting — Sawing — Planing



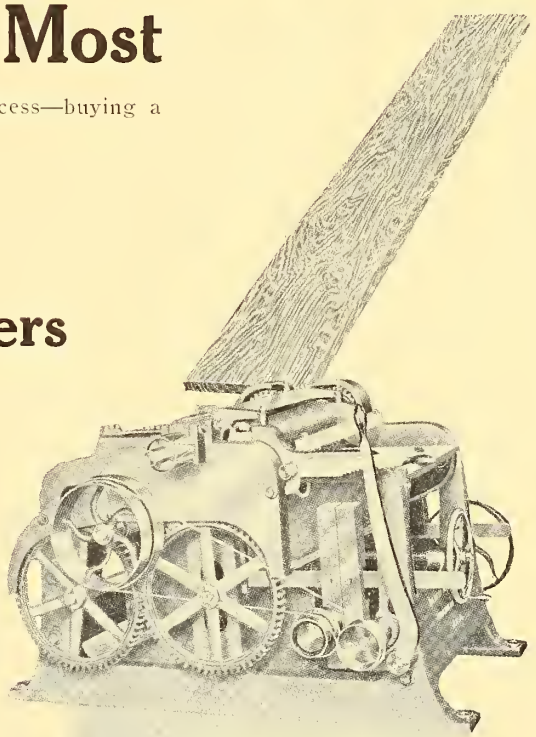
The Planing Counts Most

A planer that does its duty often swings the business up to success—buying a planer merits your deep study.

Fully and frankly, we tell you about

Whitney Planers
Single and Double Surfacers

We detail the reasons why the installation of a Whitney will increase the volume of your planing output and better the quality—why the upkeep and operation costs are carried down to the lowest possible notch—how Whitney Planers stand up sturdily to the hardest kind of day-by-day service—we also suggest the most efficient equipment for your work of square cylinders and two or four ordinary knives or round cylinders and four thin high-speed steel knives and jointing, grinding and setting devices.



No. 4 Whitney Single Surface Planer

Just write us a line

Notice how Whitney Planers are found in woodworking shops that are considered representative.

BAXTER D. WHITNEY & SON, Winchendon, Mass.

H. H. Plummer & Co.,
Monadnock Bldg.,
San Francisco, Cal.

Canadian Representatives:
H. W. Petrie, Limited
Toronto, Ontario

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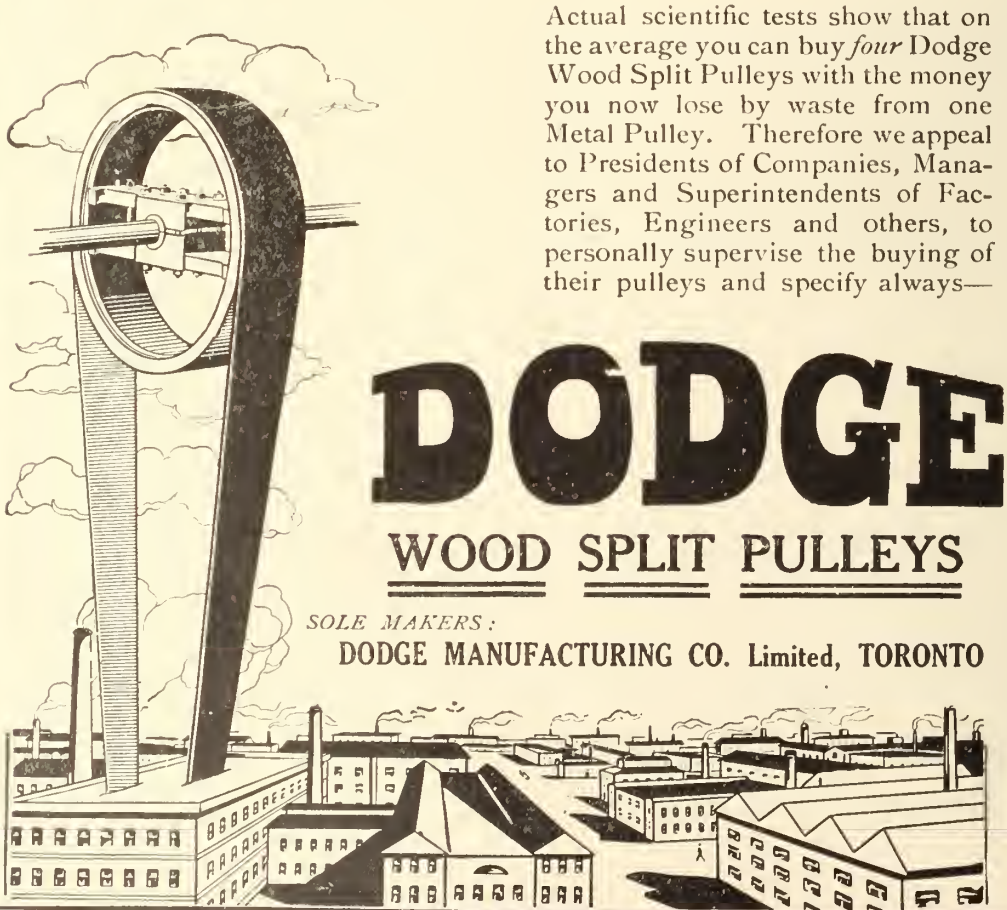
That grim spectre—

RELENTLESS and ever present in Factory operation is the spectre of Overhead Charges.

Its ravages among the profits of your business must be constantly checked. One of its most active lieutenants is *Power Wastage* —caused by belt slippage over metal pulleys. Many thousands of dollars are wasted yearly in Canadian Factories and workshops where Wood Pulleys would save 50% of the waste.



Actual scientific tests show that on the average you can buy *four* Dodge Wood Split Pulleys with the money you now lose by waste from one Metal Pulley. Therefore we appeal to Presidents of Companies, Managers and Superintendents of Factories, Engineers and others, to personally supervise the buying of their pulleys and specify always—

DODGE

WOOD SPLIT PULLEYS

SOLE MAKERS:

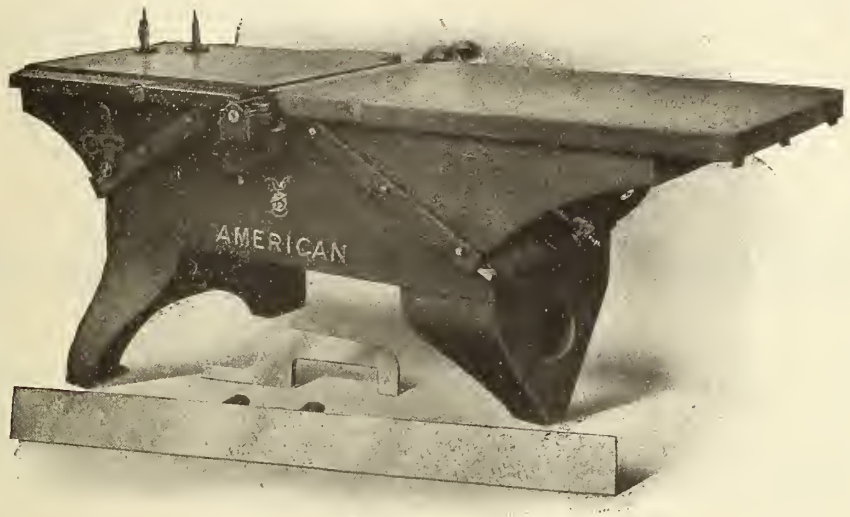
DODGE MANUFACTURING CO. Limited, TORONTO

5

GARLOCK-WALKER MACHINERY CO. LIMITED

32 FRONT ST. WEST, TORONTO TELEPHONE MAIN 5346

American Buzz Planer and Hand Jointer



Made in 8″, 12″, 16″, 24″, 30″, 36″ sizes

also with power feed

NOTE

Adjustable Boxes

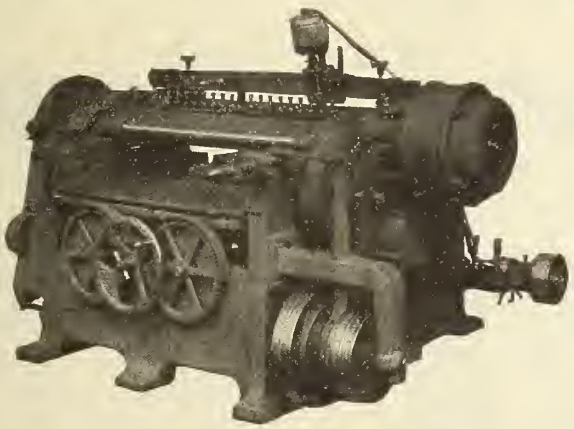
Long Gibbed Incline ways for raising and lowering table.

Steel Lips

7′ Table

Angular Adjustable Fence.

American No. 444 Single Furniture Planer



Feeds up to 85′ per minute.

Detachable Side Clamping Cylinder Boxes

Round Cylinder

Knife Setter and Jointer

In Feed Rolls and Chipbreaker either solid or sectional

Feed Rolls of large diameter—all powerfully driven

Write for prices and deliveries on above machines or other tools of like calibre

Garlock-Walker Machinery Co., Limited

Canadian Representatives

American Wood Working Machinery Co., Rochester, N.Y.

M. L. Andrews & Co., Cincinnati, Ohio

METAL and WOODWORKING MACHINERY of all Kinds

THE COMPLETE LINE

Top Bearing

PIANO CASTERS

Heavy Steel

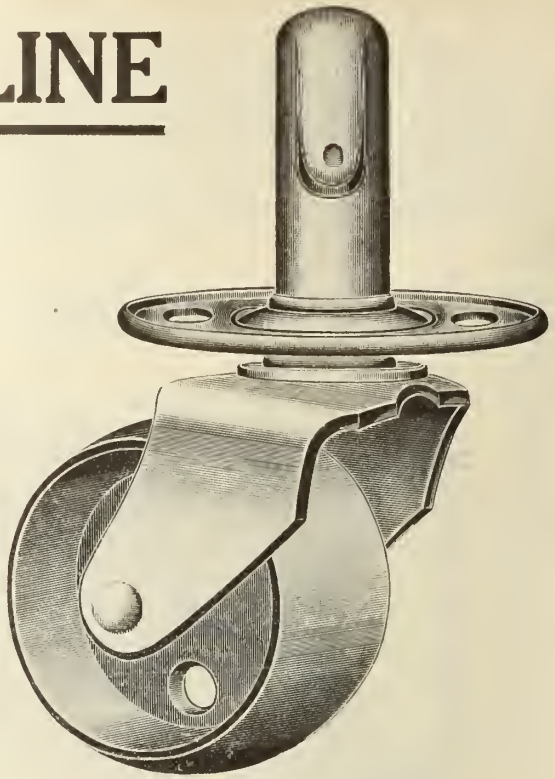
These Casters are sturdy, reliable and superior in every way.

The Top Bearing Socket enables them to swivel easily under the heaviest pianos.

Period Trimmings

in every style for all kinds of furniture.

Our Canadian representative is at your service.



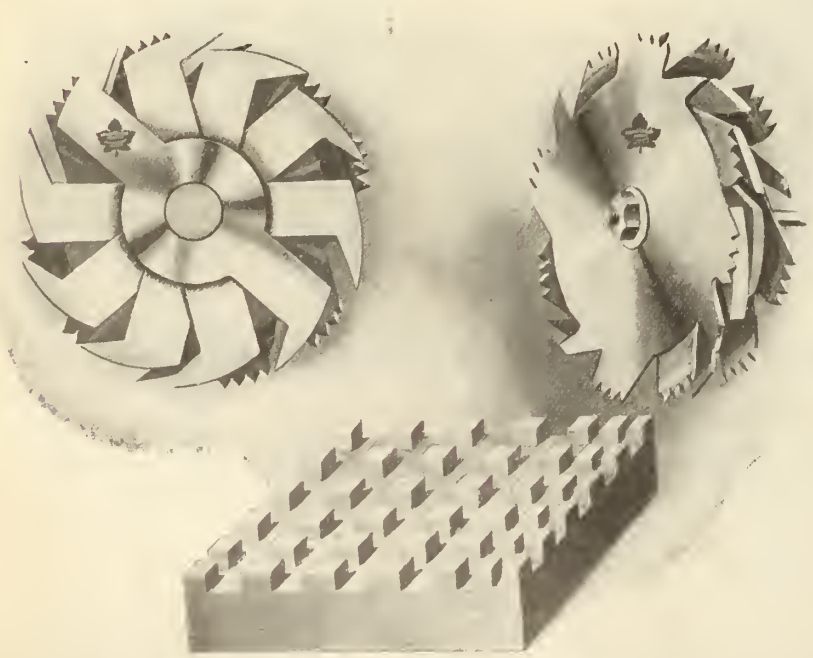
No. 161—PIANO CASTER—Top Bearing

FOSTER MERRIAM & CO. MERIDEN, CONN.

Canadian representative—F. A. SCHMIDT, Kitchener, Ont.

It Pays to Use

"Maple Leaf" Saws



We manufacture—

Bands,

all kinds of

Special Circular Saws

for Special work,

Cross Cut Saws,
Gang Saws,
Grooving Saws,
Chamfering Saws,
Concave Saws,
etc., etc.

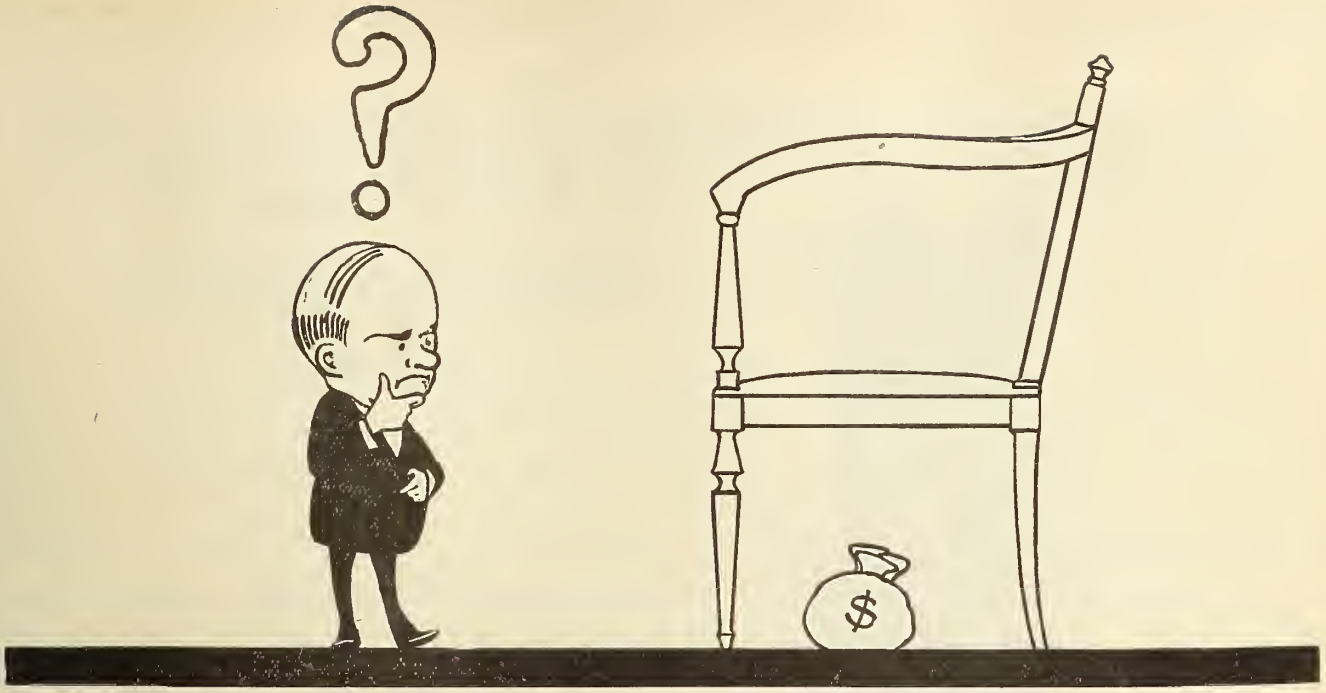
EVERY SAW GUARANTEED.

Write for Catalogue

Shurly-Dietrich Co., Limited

GALT - CANADA

Vancouver, B.C. Hull, Quebec



There's Money in Period Styles–IF–

You're prepared to make them economically—to put them within the financial reach of the Canadian Housewife. She buys the furniture for thousands of families that are waiting for Period Styles to be put within their financial means. That's the market you can reach if

You Have A Yates - formerly BERLIN Automatic Shaping Lathe

Makes any oval, round, or polygonal pattern at a speed of from one to three a minute. Employs the shear cut—leaves all edges, beads, or small parts clean and unsplintered. Finish is so smooth that for many purposes no hand finishing is needed. Any shop hand of reasonable intelligence can operate it successfully in a few minutes. All turning operations are entirely automatic There is no other machine of its kind on the market so entirely free from mechanical troubles, none that performs its work with such perfection of detail as the Yates Automatic. It is sold at a price within the reach of every furniture manufacturer.

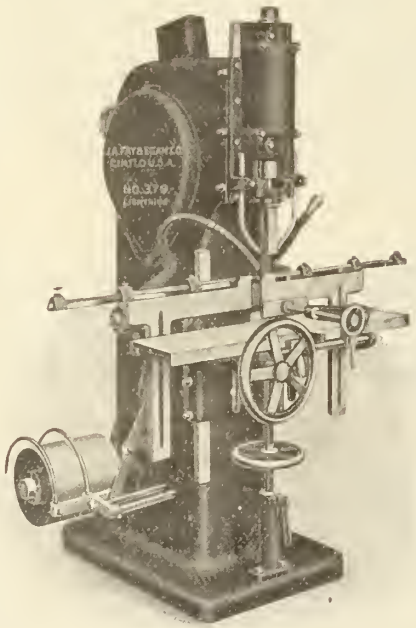
Keep your eye open for "Making Good With Period Styles," a booklet telling an interesting story about the Yates Automatic Turning Lathe. Another "Period Patterns" shows fully what it will do. Ready now. Sent free, without obligation or expense.

P. B. Yates Machine Co. Ltd.

HAMILTON, ONT. CANADA

U. S. PLANT: BELOIT, WIS.

Side View



Front View—Plain Table.

—A New Automatic Hollow Chisel Mortiser

FAY-EGAN LIGHTNING **No. 379**

—carries chisels up to 1 ½" square.

—stroke adjustable from 0 to 5".

—four speeds to chisel ram.

—micrometer set for chisels and augers so you won't break chisels.

—self-contained blower for removing chips.

—all mechanism enclosed.

—bronze bearings.

—plain, compound, or universal table.

—everything you hoped some day to find in your ideal of a mortiser.

Write for Bulletin J-26.

J. A. FAY & EGAN CO.

153-173 W. Front Street CINCINNATI, OHIO

Shimer Cutter Heads

Are you in need of Shimer Cutter Heads for V Sheeting, Shiplap, Box Board or Matching?

They are made to suit the individual requirements of the Manufacturer in the Planing Mill, Sash and Door, and Furniture Factories.

If you are interested in **Dado Heads, Shell Box Boring Heads, Planer Knives, High Speed Steel Knives, Planer Bolts, Solid Glue Joint or Shaper Cutters,** write for prices.

SHIMER CUTTER HEAD CO. OF CANADA, LIMITED

GALT, ONTARIO

Successors to Samuel J. Shimer & Sons, Inc.

No. 25 American Blue Book-240 Pages

SAW AND KNIFE FITTING MACHINERY AND TOOLS

This new catalogue is very much the most complete in its showing of Saw and Knife Fitting Machinery and Tools that has ever been published, and shows the manufacture of the three factories for which this company acts as distributor, viz.:

Baldwin, Tuthill & Bolton. Covel Manufacturing Company. Hanchett Swage Works.

All catalogues and price lists heretofore published and distributed relating to these lines should be destroyed or abandoned immediately. This new general catalogue contains equipment for all purposes, the very best in type, adaptation, and efficiency, and possessing the greatest popularity.

Correspondence invited.

Machinery Co. of America

American Saw and Knife Fitting Machinery and Tools

Cable Address
"BALCOHAN", Grand Rapids
Codes Used
Liebers and Western Union

General Office 505 Sixth Street
GRAND RAPIDS, Mich., U.S.A.

Factories at
Benton Harbor, Big Rapids, Grand Rapids

Distributors for
BALDWIN, TUTHILL & BOLTON. HANCHETT SWAGE WORKS. COVEL MANUFACTURING COMPANY

Saw Anvils, Brazing Clamps, Brazing Compound, Filers, Filing Clamps, Forges, Gummers, Hammers, Lap Cutters, Lap Grinders, Leveling Blocks, Pulleys, Retoothers, Setters, Shapers, Sharpeners, Solder, Straight Edges, Stretchers, Swages, Tension Gauges, Tools.
Bandwheel, Cutter and Tool Grinders. Knife Grinders and Balances.

A Complete Line of Automatic Rip and Cross-cut Circular Saw Sharpeners

for saws from 3 to 96-in. diameter, in all types used on wood or metal sawing. Let us recommend and quote you.

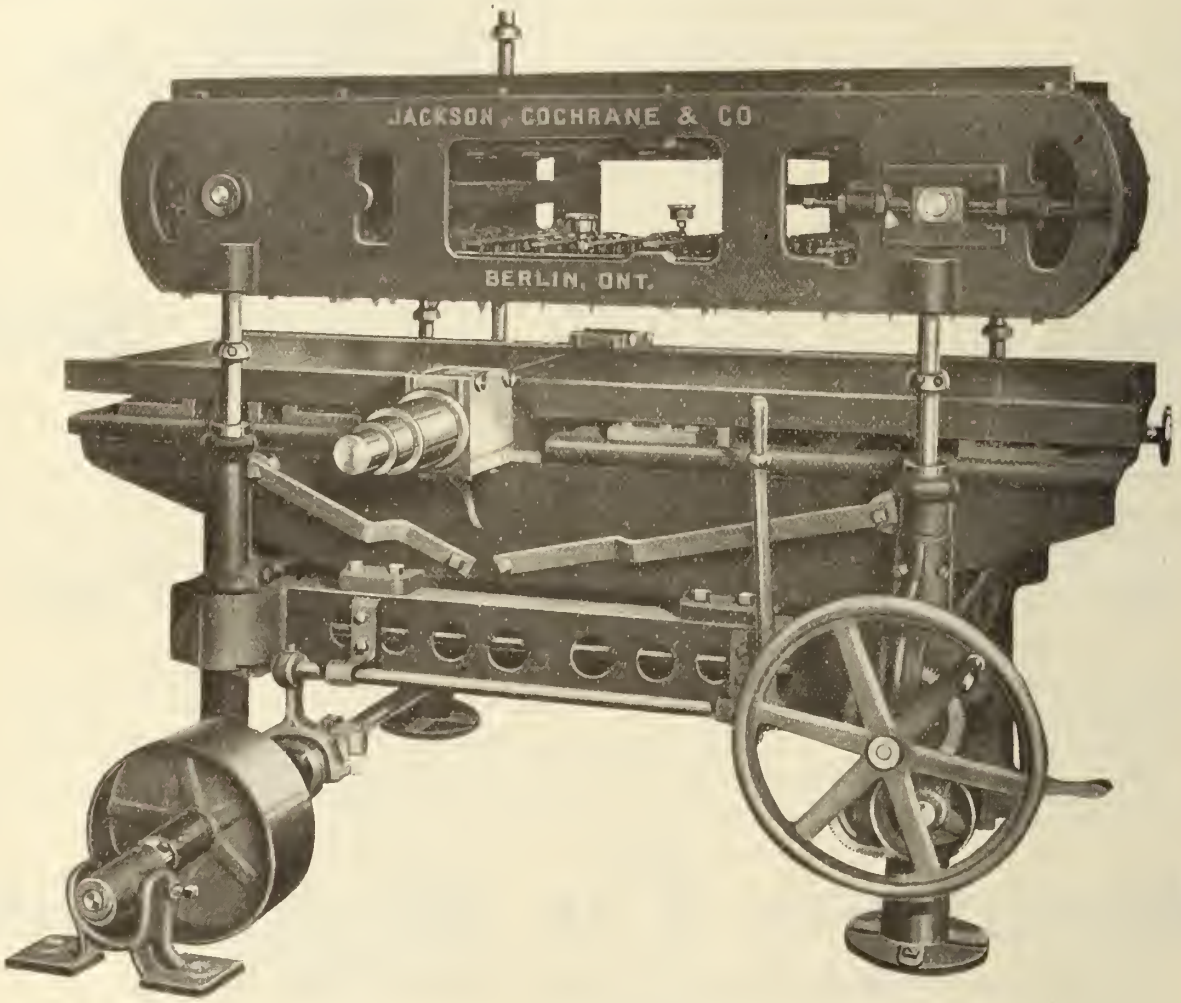
The

Herzog Self-Feed Jointer

means

Increased Production
Small Floor Space
Simplicity of Operation
Safety to Employees

Does Four Times the Work of the Hand Jointer.



Our No. 34 Herzog Jointer, illustrated above, is one of the most efficient machines on the market to-day. It is appreciated by the manufacturer and employees alike, because, while it will produce from three to five times as much work as the hand jointer, it does not require skilled operators, but eliminates the danger so common to other makes. It can be operated by two boys. It will handle stock varying in width from 1 inch to the full width of the jointer, will feed fast or slow, takes only one-fourth the floor space of hand jointers, and requires only one-fifth of the sharpening of the knives. It is fitted with power feed raising and lowering attachment, with cylinder double belted and driven from both ends.

If interested in reducing your costs, write us.

Jackson, Cochrane & Company

KITCHENER, CANADA

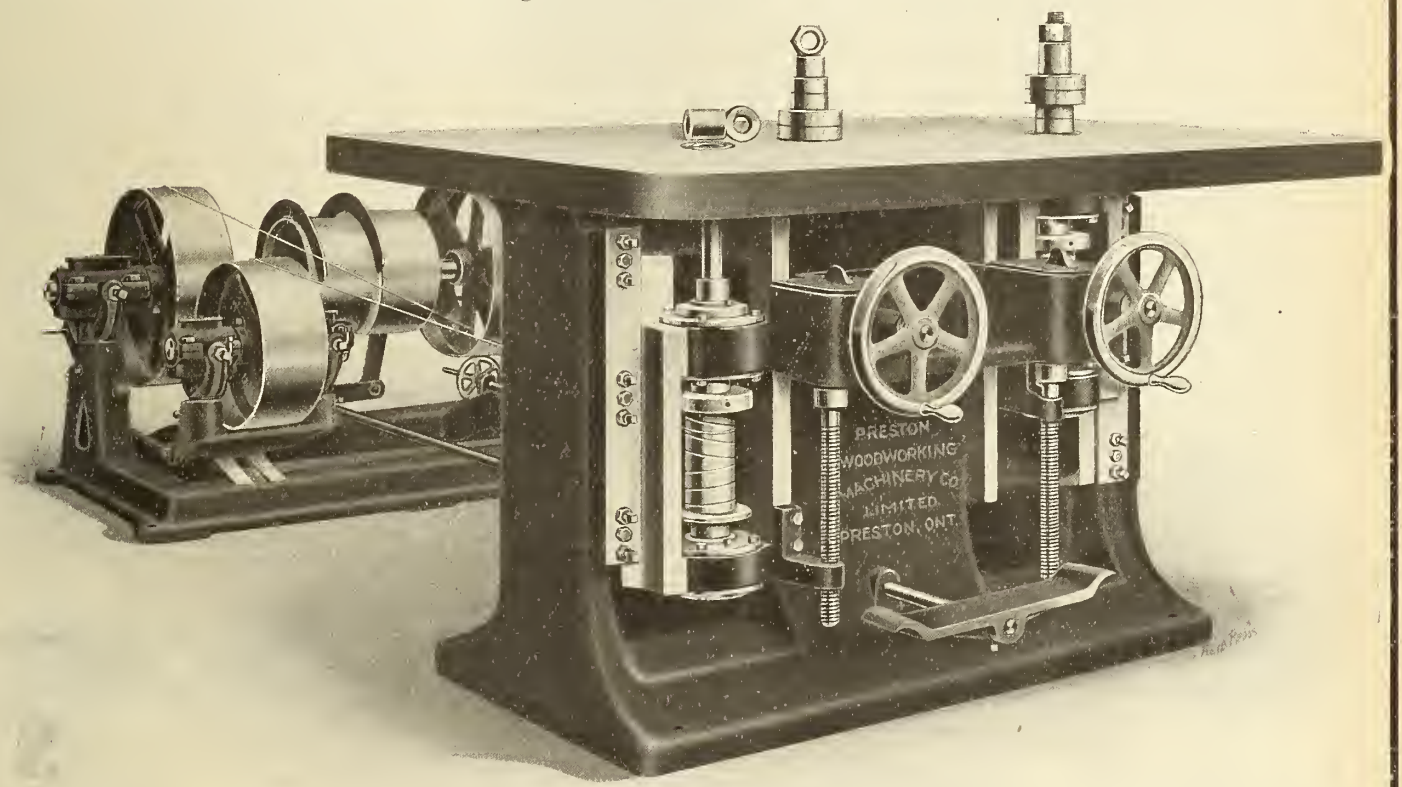
"Treat your machine as a living friend."

Think This Over TWICE:

Is your competitor producing more cheaply than you are on any particular operation in his plant?

It hurts to think so, doesn't it? And then, on the other hand, what a pleasant feeling to think that you have this same operation down considerably finer and closer than this competitor neighbor.

How about your shaper cost? Are you thoroughly satisfied with it? If you have any doubts whatever, why, just ask us for a circular describing the machine shown below.



No. 162 High-Speed Ball-Bearing Shaper

SEE THIS MACHINE!

It will turn out 100% MORE WORK than the ordinary shaper which you are now using. That's our claim; twice the amount of work and much easier on the operator. Is it worth your while to cut your shaper cost in two? If so, drop us a line for more particulars.

THE CHEVROLET MOTOR CO. ARE USING 6 OF THESE MACHINES IN THEIR PLANT AT OSHAWA

DIMENSIONS, WEIGHTS and SPEEDS

Floor Space, 120 in. x 58 in. Net Weight, 2650 lbs. Shipping Weight, 2750 lbs. Tight and Loose Pulleys on Countershaft, 10 in. x 6 in. Driving Pulleys on Countershaft, 18 in. x 5 in. Idler Pulleys, 14 in. x 5 in. R.P.M. Countershaft, 1200. Pulley on Spindle, 3⅛ in. x 6 in. R.P.M. Spindle, 7000. Diameter Spindle, 2 3/16 in. Spindle Centres, 28 in. Table, 58 in. x 41 in. Diameter Spindle Top, 1¼ in. Horse Power Required, 3. Front Projection, 17 in. Height, 35 in.

"The Machine you want in your plant is not the cheapest machine to buy but the machine that will save you the most money to use."

The Preston Woodworking Machinery Co. Limited, Preston, Ont.

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Edward Clark & Sons

Toronto

CANADIAN HARDWOODS—winter cut **Birch, Basswood, Maple**

Ontario and Quebec Stocks, East or West, rail or water shipment direct from mill to factory.

Let us quote you on bored diaphragms for Bethlehem boxes and Linderman jointed hardwood ends and handle cleats for six inch boxes.

We Commend to Your Notice:

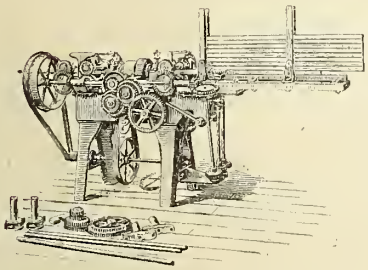
Our lumber is **reliable**, our grades **uniform**, our shipments **prompt**, and **receive personal supervision**; our prices **consistent**. We have had **long experience**. We desire **to serve**.

SPEED UP YOUR HANDLE PRODUCTION!

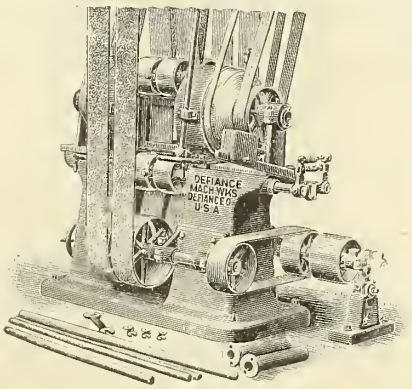
IT WILL NOT ONLY MAKE YOU MORE MONEY, but will strengthen your business and enable you to profitably meet the keenest of competition.

WITH THE ILLUSTRATED EQUIPMENT you can turn, polish, tenon and chuck straight, tapered and swelled handles of the long-handle type with speed and accuracy equaling or surpassing that of the foremost manufacturers in the handle industry. We have placed many of our handle machines in every leading manufacturing nation throughout the world. This we hold to be a recommendation worthy of your consideration.

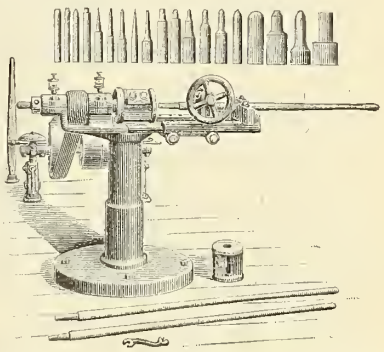
We build a complete line of up-to-date machinery for making handles of every shape and description



The Chaplin Patent Automatic Handle Lathe.



The No. 2 Patent Automatic Handle Polishing Machine.



The No. 1 Improved Chucking and Tenoning Machine.

Write for descriptive matter and quotations to

The Defiance Machine Works, DEFIANCE, OHIO, U.S.A.

Everything in Woodworking Machinery—Over Five Hundred Designs

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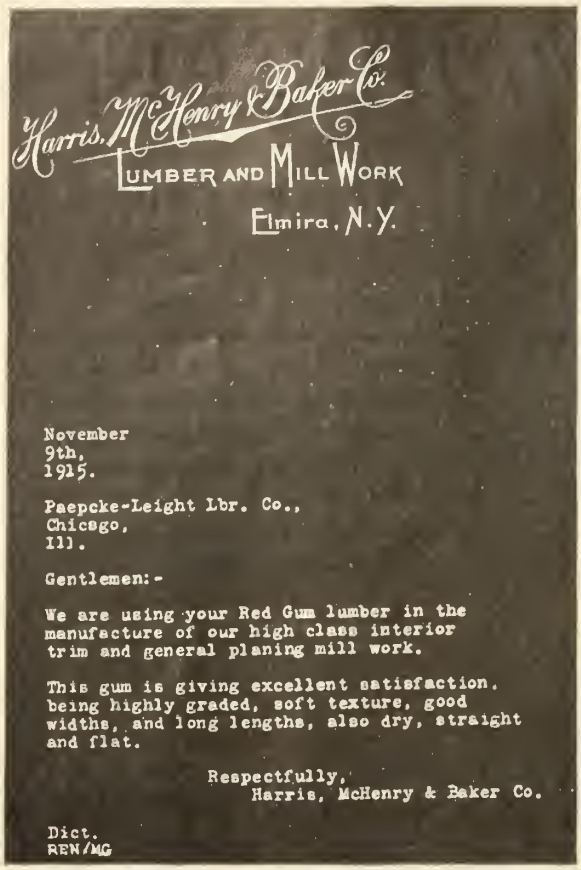
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November
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Canadian Woodworker

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Reaches the factories producing interior finish, doors, sash, flooring, woodenware, furniture, pianos, boxes, and general mill products.

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Sharing Profits With Employees

At least one Canadian furniture factory has decided to share its profits with its employees. While some manufacturers may be inclined to regard such a policy as wholly unnecessary and deem it an act of philanthropy, if they will take the trouble to consider it from all its angles, in all probability they will come to regard it in a different light. The human factor in industry to-day is where efficiency engineers have to stop. They can rearrange machines and alter mechanical conditions generally with a view to speeding up production, but they cannot rearrange the make-up of a human being. The human being himself is the only one who can do that—that is, when health and intelligence permit.

Every manufacturer knows that without the co-operation of his employees he can accomplish very little in speeding up production. The feature that a great many of them appear to overlook, however, is that it is necessary to offer some inducement to the employee to secure his co-operation. No man can put his best efforts into his work when he knows that his employer is taking advantage of him by paying him the lowest wages he can possibly get away with. There are instances, of course, where the employer fully intends that his employees shall receive good wages and is ignorant of the fact that they do not. He leaves the operation of his factory entirely in the hands of subordinates, who, in order to make a showing, deliberately pay poor wages. Then again, there are instances where the subordinates cannot be blamed entirely, as they either have to show certain profits or make way for some person that will.

In dealing with men, the first thing to remember is that they **are** men, and then treat them accordingly. Gradually, you will find them loosening up and applying themselves to their work as if it were a pleasure—and generally work is a pleasure when the conditions are satisfactory. Money does not always stimulate men to put forth their best efforts, but a liberal policy of remuneration, together with the knowledge that they are regarded as members of the organization and not mere pieces of equipment, will work wonders. By this we do not advocate that every firm should share its profits with employees, as such a plan is not always feasible. We do advocate, however, a broad-minded policy in dealing with labor as the most lasting method of securing loyal co-operation, which in turn means "efficiency."

Manufacturing Bethlehem Shell Boxes

Last fall the Munitions Board gave out orders for somewhere in the neighborhood of a million of the Bethlehem shell boxes, and shortly after the orders were given out manufacturers were instructed to cease making them. They have now received instructions to resume operations, and the first deliveries were to be made around the first of February.

Possibly the three-ply glued-up diaphragms used in the construction of this box had something to do with the holding up of deliveries, as we are told that supplies of good thick veneers are hard to get. Then again, the difficulties of boring the diaphragms have been greater than anticipated.

Some manufacturers are buying the lower grades of birch in 1 x 9 inch stock and up, and resawing it for cores for their diaphragms. The inch stock when resawed makes two pieces of core stock. Factories using a gluing machine can soon make up considerable diphragm stock in this way. The resawed birch is cut in lengths equal to the width of the stock being used for face veneers. The face veneers are put through the gluing machine and the pieces of resawed birch, which have previously been placed in a caul heater, are laid side by side on the face veneer until they make the required length. The other face veneer is then put through the gluing machine and laid on top. A pile of stuff is soon put together in this way, and then it is placed in the press and the pressure applied.

Orders were placed recently for 400,000 or 500,000 shell boxes for the 2-round, 6-inch shell. The new or-

ders call for a box a little longer than the former one. The new box is called the "Mark 3" and is about 2¼ inches longer than the "Mark 16." It has also been strengthened by the addition of steel bands on the corners. The boxes are to be made of pine and spruce with pine ends.

Prosperity for Canada

In many respects the year 1916 was the most prosperous year in the history of Canada, despite the fact that nearly four hundred thousand of our young men have been withdrawn from routine trade channels and voluntarily joined the colors. The year 1916 had the advantage over previous years in that this Dominion has been exporting at the rate of $500,000,000 per annum more than she has been importing, and that, therefore, by the end of the country's fiscal year, March 31st next, we will have a favorable foreign trade balance of half a million dollars. For the two fiscal years ended March 31, 1917, Canada will have sold about $800,000,000 more than she has purchased abroad in the two-year period. In other words, by mid-summer of 1917, Canada will, since the commencement of the war, have received a surplus of one billion dollars on her foreign trade account.

This fund of one billion dollars represents surplus "earnings" for Canada, and it is due entirely to the purchase of our food products and the products of our factories by European consumers. It is essentially artificial, but it is none the-less tangible, and briefly explains the extraordinary prosperity now existing in practically every form of business enterprise, including the manufacturing and purveying of luxuries.

Canada, therefore, in a period of two and a half years, has been enabled to clean up some very heavy liabilities, and furthermore to put undreamed-of cash balances to one side as insurance against any untoward business circumstances which may develop in the future. Canada also has been provided with a superabundance of working capital, which she has lacked in past years.

The most convincing factor in the future business outlook of Canada is the extraordinary strength of the steel industry and the assurance of a year of intense activity on all our steel plants when peace in Europe has finally been signed. Steel is a basic industry. Activity throughout the steel trade represents activity in a thousand and one grades of industry. That is a well established fact, and while those companies which today are engaged in the manufacture of shells and other finished war materials, will require a few months to readjust their plant to peace products, and while there will be considerable unemployment for a period of three to six months, the basic industry of steel making will provide a lively turnover in general business which will enable the country to maintain some of the momentum secured in the two and a half years of abnormal activity.

Toy Exhibition

A toy exhibition was held in Toronto, in the Traders Bank Building Annex, 8 Colborne Street, from February 5th to 17th. The exhibition was a little different this year from the one held in 1916. In the previous one a large collection of toys and novelties of foreign manufacture gathered from various sources were on view for the purpose of showing Canadian manufacturers what class of toys had been imported.

This year the exhibition was made up entirely of the exhibits of Canadian manufacturers, which would seem to indicate that the manufacture of toys has passed beyond the experimental stage. Representatives of the manufacturers were right on the job with their order books handy and quite a number of buyers were in evidence. The toys shown covered a wide range and whereas last year's exhibition attracted large numbers of the public, this year's show bore the earmarks of a business proposition. This is as it should be, and it is to be hoped that this year's exhibition will be successful enough to warrant it being held annually.

Important Subject in Each Issue

Commencing with this issue it is our intention to select each month some subject of direct interest to those engaged in the woodworking industry and deal with it in leading articles. These subjects will cover a wide range and should be closely followed by our readers, as they will contain valuable practical information. We will, of course, continue to publish contributed articles on practical subjects, and short illustrated articles dealing with quick methods of doing difficult jobs, in conjunction with the leading articles.

The subject featured in this issue is "Canadian Hardwoods," and the information contained in our article has been secured from reliable sources. Our illustrations give some idea of what Canada is producing in the way of hardwoods. The most notable feature in regard to the woods in this country is the fact that the remaining stocks are located largely in territory away back from the railroads. This adds greatly to the cost of taking out the timber, and naturally increases the cost of the lumber.

Varnishing New Woodwork

When sufficient time is allowed for the first coat to penetrate the wood three coats will be found sufficient to turn out a job, if the following method is adopted: The first coat, three parts turpentine and one part varnish; second coat, vice versa—three parts varnish and part turpentine; third coat, varnish only. It is time that makes the job—neither the painter nor the varnish. The longer the period between the application of each coat the better.—H. E. H.

It is unwise to take on a job merely with the object of keeping somebody else out.

Kiln Drying Gum Lumber

H. D. Tiemann, in charge of the kiln drying and other technical work at the Forest Products Laboratory, Madison, Wis., in discussing the proper handling of gum lumber in kilns, at a recent meeting of the Gum Lumber Manufacturers' Association, reviewed some experiments that were made on gum, first on air-dried stock shipped from the mill in air-dry condition; second, on logs cut at the laboratory mill and dried there green from the saw. Some of this lumber weighed as much as 6,000 pounds when it came from the laboratory mill. The results were eminently satisfactory and hence, according to Mr. Tiemann, there is no reason for not drying gum direct from the saw, particularly as it has such distinct advantages. It shows, when properly handled, less loss than when the stock is previously air-dried. He instanced, however, as the requisite of the kiln in which the lumber is to be dried that it have proper control of circulation; proper control of temperature and proper control of humidity.

Mr. Tiemann said that his experimental results accomplished a shipping dry condition in eleven days, and a kiln-dried condition ready for use in twenty-nine days. The work eliminated entirely case-hardening and checking and resulted in no degrading whatsoever from checking. There was a degrading from warping of about 2.5 per cent. and the shrinkage amounted to about the same as in air-dried stock.

He presented a number of panels which had been shipped down out of the lot kiln-dried direct from the saw about three weeks prior to the meeting. These specimens and several boards which were on exhibition made a favorable impression upon the lumbermen.

Mr. Tiemann then explained the method of controlling humidity and circulation by means of a spray of water. The kiln is started in a high state of humidity, which is allowed to drop slowly at first and then rapidly. The temperature, on the other hand, is low when the lumber is first put in and raised to 140 degrees or 150 degrees.

Cupping of the lumber is gotten rid of entirely by means of live steaming at about 180 degrees for an hour or two just before the lumber is taken out of the kiln. This also eliminates case-hardening entirely. He suggested that if the lumber is case-hardened before drying, it should be subjected to steaming process at about 200 degrees temperature for a day before it is put into the kilns, and that it is impossible to dry the lumber without first steaming it after it is case-hardened. Mr. Tiemann said that there is very little chemical change in kiln drying on temperatures under 250 degrees Fahrenheit.

There followed various questions and answers and a discussion of the various types of kilns, the final conclusion being that various designs of kilns are adequate if properly constructed and if they give the same possibilities of controlling humidity, circulation and temperature.

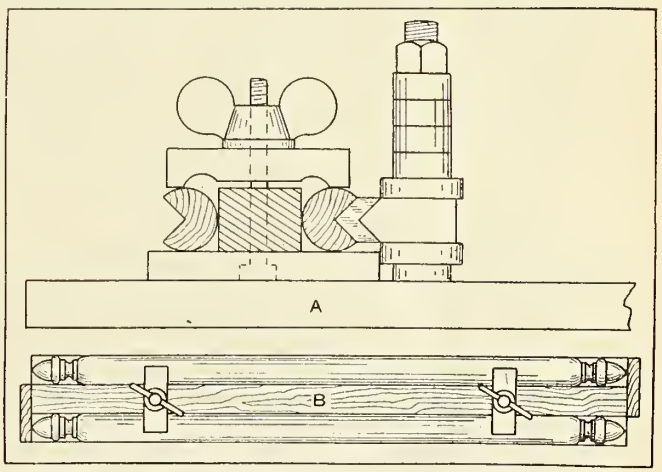
Mr. Tiemann said that sap and red gum required the same treatment, but that sap has about 50 per cent. more water.

A prominent furniture man described his method of creating circulation initially for the purpose of thoroughly heating the lumber in the kiln, saying that his company has a process of its own design; that a jet of steam passing up through the piles answers the same purpose as the spray of water in Mr. Tiemann's process. This company has two types of kilns and in its box kilns which hold one car of lumber, it has five steam coils. Gum is started by turning on the first steam spray, the temperature being below 100 degrees. When the lumber is thoroughly saturated with heat, cold water is turned into condensing coils and the second heat coils then started. The lumber is taken out at a temperature of about 160 degrees, although it may be as high as 200 degrees at the end. He said that in drying maple the best results have been obtained from green lumber.

Making Corner Beads

A simple and quick way to make corner beads on the shaper is shown in the illustration. A shows the end of the form that holds the stock and how the shaper head cuts the square into the corner bead. The reason for using the cutters on the shaper head is that you grind them to cut a perfect square, and as you pass along the collar of the shaper with the form it makes the required cut. At B is shown the top view of form with two corner beads on it.

The form is used double; with one setting it will cut two beads. It holds the round pieces tight enough so they will not turn or pull out when the shaper cuts them. The form is made of a flat piece of wood, the length of the corner beads, and in width about three



Making corner beads on the shaper.

times the thickness of the bead. Get out a square piece to fit between the two rounds, so when you put them on the flat piece one will fit on each side of the square piece, and the cutters will cut the square on them. Put a stop at each end, as shown at B, and bore two holes in centre piece for a bolt to go through. Countersink the head of the bolt into the bottom and put an eared nut on top, with a washer under it. Then cut two pieces to extend over the rounds about two-thirds the way out. Cut this piece a little hollow, as shown at A, then when you turn the nut down on the rounds it will hold them so tight that no cutter can pull them out. This piece is made of hardwood.

This form can be used in many different ways on the shaper. You can put a piece of wood in it and shape all four edges to any shape required. The screw in centre of form is to hold the wood in place. In this case it is not necessary to put the stop on form, as shown at B. When shaping all four edges of a piece, let the collar of shaper go all round the form. Put two pieces in the form, one on each side, and shape one side and end. Then reverse the pieces, putting the side just shaped against centre of form, only on reverse side, and shape the other side and end; put another piece on the first side and continue as before.—H. C. S., in "The Woodworker" (Indianapolis).

The Hardwoods of Canada

Plentiful Supplies of the Finest Birch, Elm, Ash, Maple and Basswood—Logging Operations Now Being Carried on in Territories Formerly Considered Inaccessible—Long Hauls and Increased Cost of Camp Supplies Means Higher Prices for Lumber — Labor Shortage Has Seriously Affected Production

Few Canadians realize what enormous values we hold in hardwood timber in this country. It is true the variety is not great, but, of certain woods, particularly birch, elm, ash, maple and basswood, we have large quantities of a quality second to none. The war has, to a certain extent, thrown us on our own resources, and has brought out the fact that Canadian hardwoods are excellently adapted for a wide variety of work.

Northern Ontario, from Sault. Ste. Marie east and north of the line of the Canadian Pacific Railway, contains a considerable amount of birch and maple timber. The territory south of the C. P. R., taking in the Parry Sound district, the Muskoka district, Central Ontario, the territory in and around Wiarton and the Owen Sound section of Northern Ontario, are sources of mixed hardwood supply. The belt of Quebec lying north of the Ottawa River, and a considerable section of southern Quebec, also contain large tracts of mixed hardwood timber. There is a considerable quantity of birch in Nova Scotia and New Brunswick, but the hardwood districts of these provinces have not been very much developed except for a small export trade.

Hardwood Trade in Its Infancy

The hardwood lumber trade of Canada is in its infancy, but the holders of standing timber are gradually realizing that they have huge assets at their disposal in the hardwood timber that they have left standing when cutting their soft woods. Recognition of the sterling qualities of these hardwoods by the woodworking trades is gradually placing them in a position where they are selling at a price which is sufficiently attractive to make the lumberman realize that there is money in utilizing his hardwood stumpage. As this trade increases, we will be able to revive in a measure the lumbering prosperity of olden times in some of the cut-over soft wood operations of the country.

Birch is undoubtedly the king of Canadian hardwoods. There is no question that birch is only beginning to be recognized at anything like its true worth. It possesses all the qualities required for manufacturing lines where a degree of strength is required. As a wood for furniture and interior finish it has qualities of beauty which make it excellently suited. To-day, in finishing a house or building of any description, the question of harmony is receiving more consideration than ever before, and birch, as an inexpensive wood, lends itself admirably to the different lines of finish. It has been used more or less for some years as a substitute for, or imitation of, mahogany, but is gradually being recognized by the manufacturers as being worthy of consideration for its own merits.

If the proper precautions are taken in preparing birch, first in drying, then in finishing, and giving consideration as to where and how it shall be placed, the public will no doubt soon adopt and welcome it. It has been the custom in using mahogany to take every care of the wood, both in housing it and preparing it. On the other hand, birch in many cases has not received proper treatment. Too often it has been carelessly thrown around in the receiving yard, improperly kiln dried, treated with preparations which hid all the beauty and figure of the wood, and then put into buildings which were only half dry and which in many cases never would be kept in good condition. Then the blame was placed on the lumber.

Recognize Merits of Birch

With the huge quantities of birch of the very finest quality which we have at our disposal in Canada, it behooves us to recognize its merits and give it fair play in our schemes of finish and in other lines. At the present time, birch is used extensively in the manufacture of furniture, agricultural implements, organs and pianos, and interior finish, and as a result of the war the lower grades of birch have come into prominence in the manufacture of munition boxes. For the latter purpose it has proven to be good, strong, durable material.

Some samples of Canadian Maple

In addition to munition boxes, the flooring manufacturers use very large quantities of birch, and for this purpose it bids fair to rival some of the well-known brands of maple flooring. The question of supplies of birch is not hearsay. Records and personal inquiries among men well posted on the subject have convinced us that the supplies are at hand, and our illustrations convey some idea of what Canada is producing in the way of hardwoods and the uses to which they are put.

The other Canadian hardwoods

Birch logs ready to be manufactured into lumber.

Some 2½ inch birch planks at a Quebec sawmill. Note the widths.

which exist in sufficient quantities to make them a marketable product are soft elm, hard maple, and basswood. The supply of these woods, however, is not nearly so great as that of birch. There is no doubt that the soft elm produced in Canada is the equal of any produced elsewhere. It has played a prominent part in the manufacture of pianos, agricultural implements, staves, hoops, and shipping packages of one kind and another.

Supplies of Maple

The supply of maple in Canada suitable for lumber is not huge, but we are producing some very fine maple just the same. It is a hard, firm wood, and today is being used largely in the piano trade, agricultural implement trade and a small amount in the furniture trade. The bulk of it, however, is going into the manufacture of flooring. Hard maple of commercial value for the manufacture of lumber is confined largely to districts having limestone formation. The maple belt runs back from the St. Lawrence River to the north to a depth of approximately one hundred and fifty miles. The whole of western and northwestern Ontario and the Manitoulin Island and islands adjacent thereto on the south shore of the Manitoulin, have limestone formation and consequently produce good maple.

Basswood

The basswood we have in Canada, although the quantities are not large, is of a very superior quality, and owing to the fact that it is manufactured to a large extent in the winter time it runs heavy to white stock. Basswood is a nice clean cutting wood, easily worked, readily takes stain, and is much sought after by manufacturers of piano actions for making piano keys, etc. It is also used to a large extent by the furniture trade for interior drawer work where thin, light stock is required. Manufacturers of picture mouldings use large quantities of basswood, and it is in growing demand for core stock for veneered work. A prominent lumberman informed the writer that he had recently disposed of thirty-two carloads of basswood to a prominent piano manufacturer to be used for this latter purpose. Basswood is not confined to any particular formation, but when it is obtained on limestone formation it is usually of better size and texture than when secured further north.

Brown Ash

Brown ash is beginning to be used rather extensively in Canada, but as the supplies are very limited, the bulk of that used is being imported from the United States. It is recognized in the eastern United States as a fine interior finish wood. In that respect it stands on a par with oak and good chestnut, commanding an equal value, and is recognized as being easier to work and less susceptible to the effects of moisture than most of the other woods. The latter feature has brought it into prominence for the manufacture of refrigerator boxes. It is also being used rather extensively by some firms for core stock for veneering on. Brown ash is found scattered throughout the whole of Ontario and the eastern provinces, and is not confined to any particular kind of geological formation. A lumberman who is well acquainted with the hardwood situation in Canada, in speaking of brown ash, said that the brown ash in Ontario was attacked a few years ago by some kind of insect, which killed practically the whole stand.

Increased Cost of Production

Just as the high cost of living at the present time is an absorbing topic with householders, so is the increased cost of raw materials to manufacturers. With woodworkers in particular, it is becoming a serious problem, and as regards lumber the end is probably not yet in sight. Any person calling on the wood-

Good samples of ash right from the saw.

working trade is aware that next to the question of labor shortage is the question of where to get hardwood lumber for immediate use at anything but enormously increased prices. As years have gone on the available supplies of hardwoods anywhere in close proximity to points of rail or water shipment have been almost entirely depleted, so that lumbermen now find it necessary to go back into what were formerly called inaccessible territories.

This has entailed rather large expenditures for rail operations to transport the logs, thereby adding a

great deal to the former cost. Just previous to the war we had financial depressions which greatly reduced the former cuts. Then suddenly we were thrown into a business chaos. The men who spend their winters in the woods in logging operations, being naturally fitted to immediately assume the duties of soldiers, and having answered their country's call in large numbers, have left the lumber industry "on its beam ends" (if the expression is permissible) for labor. This has made it necessary for lumbermen to offer exceedingly high wages to secure men for woods operations.

Add to this the enormous increase in cost of food, clothing, and all kinds of camp supplies in the way of steel, iron and feed for horses, and we cannot be greatly surprised when we see the prices of lumber increasing by leaps and bounds. Then, too, the shortage of stocks can be accounted for by similar reasons. If the men are not available, the production must suffer. The prices of hardwoods have advanced during the past six months, possibly five or six dollars a thousand, and in the spring when the shortage in production becomes apparent a further advance in prices should not be very surprising.

Comparative Prices

It is interesting to make a comparison between present prices of Canadian hardwoods and those of twenty years ago. The average price of common and better birch in 1897 was $19 per thousand. To-day it is quoted at $35 per thousand. For a period of twelve years from 1897 to 1909 it increased only $5 per thousand. For the period of eight years from 1909 to 1917 it increased $11 per thousand. Practically the same situation exists with maple. The average price of common and better maple in 1897 was $16.50 per thousand. To-day it is quoted at $33 per thousand. During the period of twelve years from 1897 to 1909 it increased only $5 per thousand. In the period of eight years between 1909 and 1917 it increased $12 per thousand. These figures indicate exceptional increases during the latter years and lead us to believe that the present high prices are not entirely due to the war, but are due in some measure to recognition on the part of manufacturers of the value of our hardwoods.

Amount of Hardwoods Produced

The following figures, which are found in a booklet, "Forest Products of Canada," published by the Forestry Branch of the Department of the Interior, Canada, show the production of the five leading Canadian hardwoods for the years 1914 and 1915. It must be remembered that the production was lower during these years, on account of the war, than it otherwise would have been been.

Kind of Wood	1914	1915
Birch	76,424,000	85,733,000
Maple	66,610,000	47,418,000
Basswood	38,013,000	24,382,000
Elm	29,490,000	23,795,000
Ash	9,941,000	9,647,000

Results of Strength Tests

While birch, elm, maple, ash and basswood are rarely, if ever, used for structural purposes, yet they

An attractive dining room suite of elm, finished in walnut finish, made by the Meaford Mfg. Co., Limited, Meaford, Ont.

Berry boxes, crates and basket covers, one of the many uses of Birch.

are sometimes used for work requiring a considerable degree of strength. The following figures, taken from actual tests, should therefore be of interest. The weight required to deflect a stick of birch, best ash or elm 1 inch by 1 inch by 12 inches long, when placed on end and acting as a column is 3,200 lbs., while the weight required to deflect a piece 2 inches by 2 inches by 10 feet is only 51 pounds. For maple, common ash and elm, the weight required to deflect a piece 1 inch by 1 inch by 12 inches long is 2,500 lbs. and a piece 2 inches by 2 inches by 12 feet only 40 lbs.

To break a stick 1 in. by 1 in. by 12 ins. long of hard maple, birch, best elm or ash across the grain requires a weight of 720 lbs., and for a stick 2 inches by 2 inches by 10 feet 570 lbs. For soft maple and inferior grades of birch, elm and ash it takes a weight of 550 lbs. to

Interior of unfinished passenger coach. Birch, ash and maple are used for this work on account of their strength and lasting qualities.

break a stick 1 inch by 1 inch by 12 inches long. To break a stick 2 inches by 2 inches by 10 feet takes 440 lbs. Basswood is not so strong, and to break a stick 1 inch by 1 inch by 12 inches long only 350 lbs. is required, and for a stick 2 inches by 2 inches by 10 feet 280 lbs.

Broad-leaved Trees Are Hardwoods

Many a woodworker has been puzzled to know why such apparently soft woods as basswood and poplar are classed as hardwoods. The answer is that all trees having broad leaves are called hardwoods, while coniferous trees, as pine and hemlock, are designated as soft woods. In some instances the wood of so-called soft woods is much harder than some hardwoods, and vice versa. This simple explanation clears up the somewhat conflicting terms hardwoods and softwoods.

Some Hints on Sharpening Tools

By Lewis Taylor

The introduction of labor-saving machinery into the woodworking industry has greatly reduced the number of tools required by the mechanic. But what we do use we should try and keep in good shape. Therefore, a few hints about the proper care of tools may not be out of place.

A plane seems a simple tool to keep in good order, and so it is if we just keep in mind a few fundamental points. Take a rebate plane, for instance. Often there is a glue joint to be made which can only be made with this kind of plane. If the cutting iron in a rebate plane is not perfectly square and level, we will never make a true joint. If it is ever so little out of square, say it is cutting more on the inside, the joint when glued down will, of course, appear alright, but there is bound to be a lodgment of glue on the inside, thus probably paving the way for future trouble.

In the work that the writer is now engaged on we have an operation which requires a joint of this kind, and I can certainly say to anyone that has to make similar joints, that it will pay them to see that their plane is cutting true, for honest work, time saving and personal satisfaction.

Now, jointing or smoothing plane irons, as mechanics know, should be straight, with the corners slightly dubbed to prevent them digging in or planing a wide surface. There is one thing we should bear in mind in grinding and sharpening a plane iron, and that is, the pitch of the plane. Suppose we were to grind the iron with a fairly long pitch or bevel, and on sharpening it on the stone hold it to that bevel, the iron would not cut; it would jump or chatter. I knoow this because I have tried it. If, however, we held it to the pitch of the iron when in the plane, it would cut free and easy. If you want to keep a tool straight, be careful in putting it on a composition stone. It cuts so fast that it rounds the iron and puts it out of square in no time.

I found on sharpening my tools that I always got them low on the end farthest from me when on the stone, because that end gets more pressure than the nearest point. When I found that out I was more careful, and it saved me a few trips to the emery wheel.

A toothing iron should be perfectly straight across, for one of its functions is to level, and on a glue joint where the jointer iron has not been straight, the toother makes up for this deficiency.

Hand scrapers have not yet gone out of fashion, and there are still factories where they are very much in evidence. This is a tool that some men, even men that have been years at the business, have difficulty in getting to work satisfactorily. Their chief trouble lies in not preparing the scraper in the proper manner. After the edge has been filed flat, the edge and the flat sides should be rubbed thoroughly on the oil stone. The point where the edges are to be turned up must be keen and free from the white or surface steel, and then after being sharpened with a proper burnisher (a saw file ground round and buffed) a keen edge will be the result. This edge can be enlarged by using a pointed burnisher. This will give an edge that will take off fine shavings beautifully. I might say that I have found slip-stones better for sharpening scrapers than the ordinary boxed stones.

While speaking of tools, we must not overlook sandpaper blocks, as they are a necessary article in any cabinet maker's outfit. I have seen men use blocks just the size of the mouldings they are cleaning; I always prefer to have them quite a bit smaller, so that they can be worked right into the moulding to make sure of cleaning it properly. My experience has been that a soft surface on the block is a great help for good work. Either cork or felt will serve the purpose admirably.

There is one thing that we should all have, and that is, a system of working. It is surprising how much better one can get along when working in this manner. More work can be accomplished, and when there are many movements to perform one is not so apt to overlook or forget any of them. When one operation is over, we turn instinctively to the next one, and so on.

There is one little point that I might mention, although it may not seem to amount to much. Sometimes it is necessary to glue mouldings on a cleaned veneer surface. Before doing this, if a little castile soap is rubbed along the edge of the moulding where the glue will come out, it will be much easier to clean off the glue, and there will be no danger of the veneer coming off with it.

In cleaning end-wood, mouldings or otherwise, the work can be accomplished readily and quickly if a thin coat of glue size is first applied to the end wood. Care must be taken to have it thin though, as if the size is used thick it will not penetrate, and consequently will clog up the sandpaper, making a great amount of labor necessary. I did this myself once and will not forget it in a hurry.

Small things that seem too trivial to mention often spoil the appearance of an otherwise good job. Rounding the edges of a piece of work has to be done right like anything else, if it is to look right. The varnish will not lay on the sharp edge and consequently the edge shows up light. The superintendent I work for says there is an art in doing the smallest thing properly, and in finishing the edges of a piece of stock you can dub them off and spoil the appearance or you can just round them off nicely, not too much, and you will be surprised how much better the piece of stock will look. The library table that I am sitting beside now has its corners as sharp as a knife; a disagreeable thing which could have been easily remedied in the factory.

Get a good price for good work, and don't lose nerve when you hear a rumor that somebody is cutting under your price. The men who have stood for good living prices are still in business to-day; some of the others are not.

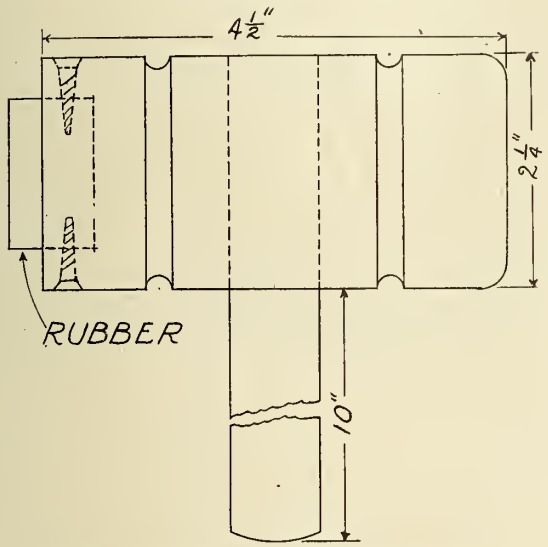
Letters to the Editor

Hammer for Assembling Cabinet Work

Hespeler, Ont.

Editor Canadian Woodworker:—

The other day I saw a cabinet maker in a furniture factory bruising up some cases while assembling them. As there may be others who are doing the same thing I am enclosing a sketch of a heavy hammer, which, if used, does away with this trouble entirely. Instead of using a piece of wood as a safeguard from bruising, here we have a piece of rubber



Hammer tipped with rubber to prevent it bruising stock.

let into the hammer (a piece of a hockey puck is a good thing) and screwed in with small screws to hold it securely. It certainly pays any cabinet maker to have one of these hammers.

Albert Hudson.

A Profit Sharing Plan

Durham, Ont.

Editor Canadian Woodworker:

On the 12th of January, our employees were called together, and as manager of the company I outlined a proposition to them which we had under consideration, with the understanding that they would be given some time to consider the matter, when we would take a canvas of the men, and if we found that it had met with their hearty support we would adopt it.

The proposition was this: To divide 20 per cent. of our net profit with our employees. The idea was to create speed, efficiency, and a mutual interest. Twenty-five per cent. of this amount was to be divided pro ratio, or according to the months that the man had worked during the year, the balance of 75 per cent. to be divided on a percentage basis, according to the earnings. In dividing it this way we had in mind the fact that a boy getting low wages would get a very small proportion compared to the man getting the extra big pay.

This proposition would mean making the employees shareholders to the extent of $40,000 of our paid up capital, and two hours out of every ten the profits derived would be theirs.

This scheme is not a new one in the old land, but we are not aware of it being done in this country at all.

We trust this information will interest your readers and hope that through the medium of your journal it may bring forth opinions which may be helpful.

The Durham Furniture Co., Ltd.,
A. A. Catton, Manager.

Standard Sizes for Photographs

"Uniform Sizes for Sample Photographs" is the subject of a letter which has recently been given to the furniture journals for publication by a travelling salesman, in the hope that manufacturers may be induced to give the matter their attention. Any person that has had occasion to look through the assortment of photographs and pages torn from catalogues carried by some furniture salesmen will agree that there is room for improvement. Some extracts from the letter follow:

A Suggestion to the Manufacturer of Furniture by a "Private" in the Army of Gripmen.

You can help the traveling salesman, who is out in the field hustling for business, and in turn help the busy buyer, by adopting a standard—one standard size of photograph for each and every item in furniture.

Think what a great improvement it would be and a help to all if manufacturers would get together on one fixed, standard size, say, for example, photo mounts to be either 7 by 7, or not to exceed 8 by 10 inches, then fix one exact size each article photographed is to occupy on this mount.

Having had considerable photographic experience, I know this latter is an easy matter. Have your photographer draw a square on his ground glass—that is, if you are using an 8 by 10 mount or plate, draw a square 6 by 8, thus leaving a one-inch margin, then have the photographer see that the image of each piece of case goods exactly fills this space.

In photographing chairs and other similar articles use the same 8 by 10 mount, and divide the space crosswise and photograph two kindred patterns at one time.

This not only produces a better appearing photo for the salesman to show, but will also cut the cost of your photos, as you get the photo of these two items at the cost of one plate, one exposure, and one print.

Furthermore, you can greatly assist the salesman by arranging all kindred patterns in groups, hinged together with gummed tape. This will assist the traveler in winning many a hard battle, showing the busy buyer all of his line when the busy buyer is not "whole soul and body on the Want List," and thus will frequently land an order, while if you have a "mince pie" assortment of photos to spread, your busy buyer won't "sit the game out." The better the line of photos are arranged and the less time required to show all of them the greater the satisfaction to all concerned.

Trusting that all of you manufacturers will get together and give this matter your earnest consideration, then assist us in attaining that for which we are all striving—"greater efficiency."

The moment a man refuses to be told anything, from that moment he ceases to learn. Even a worse fate than standing still awaits him, for he not only cuts off all avenues to progress, but runs the risk of degenerating and sinking to deeper depths in ignorance.

Results of Tests Made on Number of Woods

Illustrations Show Methods of Making Tests—Importance of Proper Nailing Emphasized—Classification Made of Box Woods

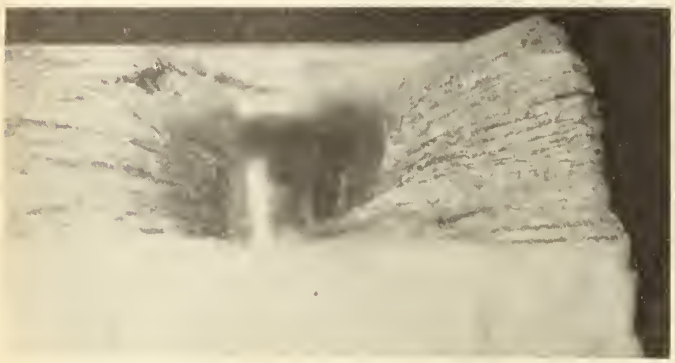


Fig. 1—Enlarged photograph of over driven nail, showing destruction of wood fibres.

A report covering the development of a box testing machine and the results of tests made with the machine was recently submitted to the American Society for Testing Materials by J. A. Newlin, in charge, section of timber tests, and Thomas R. C. Wilson, engineer in forest products, Forest Products Laboratory, Madison, Wis. The report, from which a number of extracts are printed herewith, makes interesting reading for box manufacturers. The illustrations show how the boxes are tested.

Tests of Nailed Boxes

The 185 nailed boxes tested consisted of 148 for two dozen No. 3 cans and 37 for two dozen No. 2's, including several species of lumber, as follows:—white pine, southern yellow pine, Sitka spruce, western yellow pine, yellow birch, aspen ("northern poplar" or "popple"), yellow poplar (tulip-tree), and red gum; end construction as follows: Single piece, 2-piece cleated, 2-piece with corrugated fasteners, and dovetailed; thickness of ends—½ in., 9/16 in., ⅝ in., and ⅞ in.; sides, tops, and bottoms of ¼ in., 5/16 in., and ⅜ in. sawed lumber and 3/16 in., 7/32 in., ¼ in., 9/32 in. and 5/16 in. rotary cut veneer; nailed with 4, 5, 6 and 7d c.c. nails—4 to 9 nails per nailing edge.

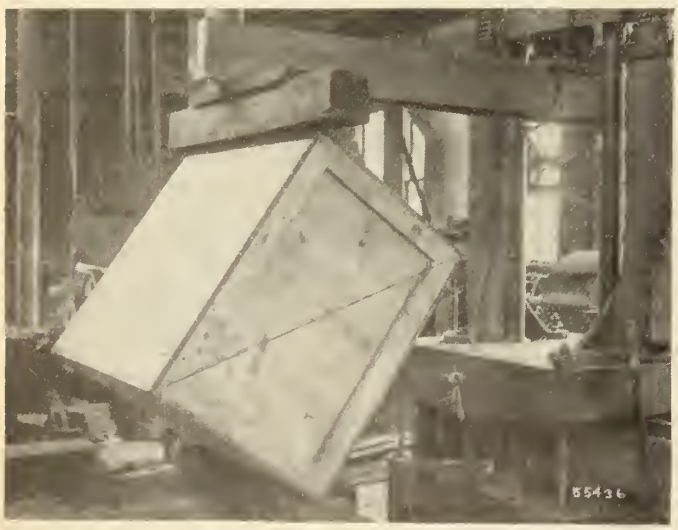


Fig. 2—Testing a nailed up box having end cleats.

Tests of Wirebound Boxes

About 75 wirebound boxes were tested. These included boxes for No. 3 and No. 2 cans bound with No. 16 and No. 15 wires; stapled with 14, 18, 20, and 24 staples per wire; with stapled, nailed and loose ends.

It is now in order to discuss the more essential points brought out by the tests, as reflected in these specifications and appended remarks.

Classification of Box Woods

The following classification of box woods is the result not only of the box tests described herein, but of tests made by this laboratory on the weight, strength, hardness, shock-resisting ability, resistance to the withdrawal of nails, etc., of the woods in question.

This classification recognizes that the proper size of nail is dependent not only on the thickness of the material, but also upon the resistance of the wood to nail-withdrawal.

Group 1

Basswood	White pine
Willow	Spruce
Magnolia	Aspen
Noble fir	Western yellow pine
Buckeye	Cottonwood
White fir	Yellow poplar
Cedar	Balsam fir
Redwood	Chestnut
Butternut	Sugar pine
Cucumber	Cypress
Alpine fir	

Group 2

Hemlock	Southern yellow pine
Larch	Douglas fir

Group 3

Elm	Red gum
Oak	Black gum
Sycamore	Maple
Ash	Birch
Hickory	Beech
Hackberry	Tupelo

Group 1 includes the woods which are softer and less resistant to nail-withdrawal and consequently require larger nails.

Group 3 includes the woods which are harder and more resistant to nail-withdrawal and consequently require smaller nails, and slightly less thickness of material in the box ends.

Group 2 is composed of woods of intermediate quality. These are the harder coniferous woods. The woods in this group are also much more subject to shakes, to heavy checking in drying, and to splitting in nailing or under rough handling than are woods of the other groups. They are considerably more variable in strength and resistance to the withdrawal of nails than are the woods included in the other two groups. For this reason it is recommended that ends made of these woods be cleated.

Nailing

The most striking development in the tests of nailed boxes was the demonstration of the inadequacy of nailing as ordinarily practiced, (This was shown

in the case of many of the boxes sent nailed up by the manufacturer) and of the very great improvement which can be accomplished by proper nailing. Also in many cases proper nailing will make possible a

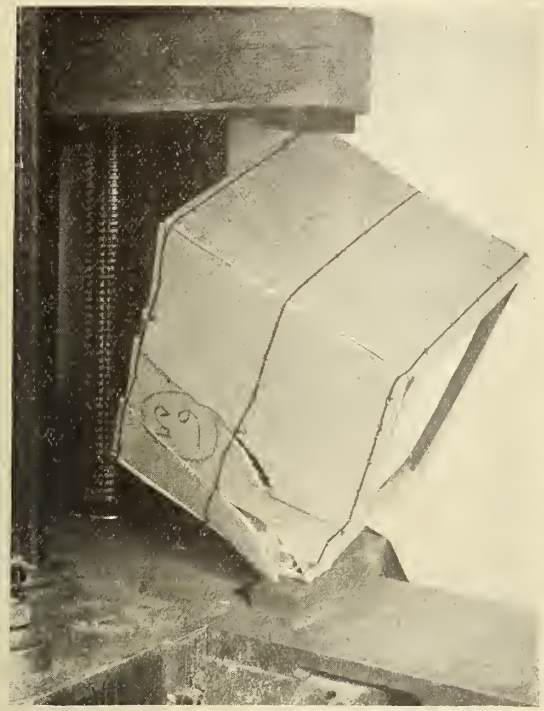


Fig. 3—Testing a wirebound box made of veneer.

reduction in the amount of lumber used and without any decrease in the value of the box.

Cleated Ends

Some of the earlier tests at this laboratory had shown the relative inefficiency of ends without cleats (either single-piece or two-piece ends). The present tests give further evidence of this. White pine, red gum, and aspen boxes with five-eighths inch two-piece ends, matched and reinforced with three corrugated fasteners averaged only two-thirds as resistant as boxes which were of the same identical construction except that the corrugated fasteners were replaced by two ⅜ in. x 1⅛ in. cleats. Failure in the uncleated boxes was due to splitting of the ends and did not occur at the joint.

In similar tests yellow pine boxes with uncleated ends were only one-half as resistant as when cleated ends were used. This does not include some boxes which did not hold together until they could be placed in the machine, and whose failure was due to shakes.

Over Driving of Nails

A few cases were observed in which nails were quite seriously over driven. The photograph, Fig. 1, shows an instance of this. As may be seen, the nail-head is driven through about one-third of the thickness of the board (which in this case was one-fourth inch thick). It is very evident that the wood fibers are distorted and damaged throughout practically the entire thickness of the board, and over a considerable area around the nail head. It was to be expected, and observation of the tests showed that the holding ability of such over-driven nails was very seriously impaired. The board is quite easily separated from the nail either by pulling the nail head through the board or by pulling the board endwise from the nail. Data is not available to give an exact measure of the decrease in the resistance of the box. However, it is easily seen that very great damage is likely to result from the practice of over driving. Care should be taken to drive nails only sufficiently deep to bring their heads flush with the surface of the box.

Effect of Storage of Boxes After Nailing

It was also observed in these tests that there was frequently considerable loss of resistance brought about by keeping boxes (after they were nailed up) in the laboratory where the air was quite warm and dry.

This effect is manifested under two different conditions:

1. If the material contains sufficient moisture that storage results in further drying, shrinkage takes place. This causes a lateral or sidewise pull on the nails (even on those holding sides to ends, since the ends, because of their greater thickness, do not shrink so quickly as do the sides; but more particularly those holding tops and bottoms to ends, since the shrinkage of the ends in the direction of their length is practically nil) and if the increased drying is sufficient splitting at the nails results. This side pull on the nails loosens them slightly and causes them to be more easily pulled, while the splitting at the nails enables the boards to be pulled from them more readily.

2. A reduction of the holding power of cement-coated nails has been observed, even when no change in the dryness of the wood into which they are driven takes place.

There are, no doubt, many things which influence these phenomena, and further investigation will be required before quantitative statements can be made in regard to them. Tests have demonstrated, however, that the reduction due to these causes is such that the causes should be eliminated as far as possible. For this reason it is recommended that boxes should not be nailed up of material containing more

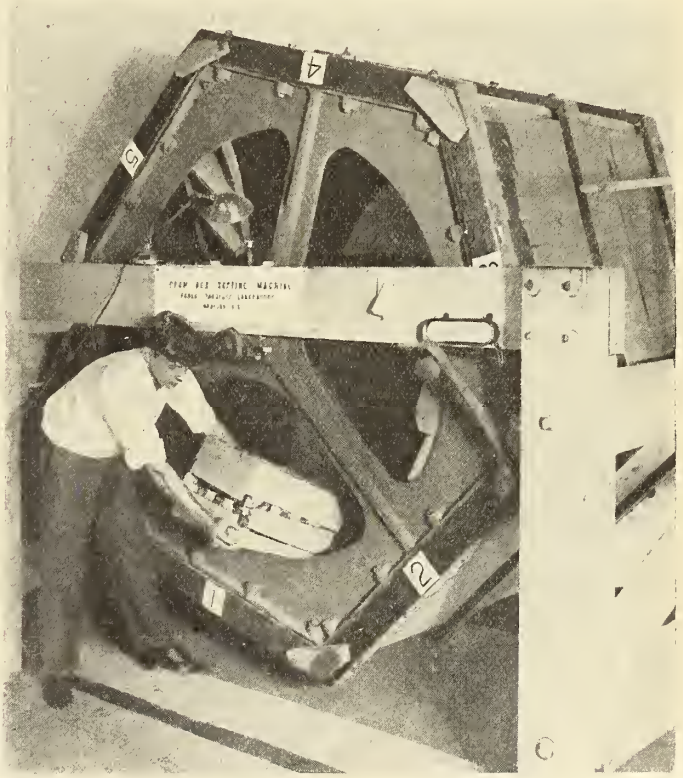


Fig. 4—Machine with which some of the tests were made. The boxes are placed inside and the drum revolved.

than 15 per cent. moisture, and that they should not be stored in a dry heated room after nailing.

Wirebound Boxes

The tests on wirebound boxes demonstrated that at least 20 staples per wire were required to produce a box capable of properly protecting its contents. With fewer staples the force acting on the individual staples is sufficient to cause the veneer to be pulled from under the staple quite readily. When 20 staples per wire were used failure was much less frequently caused by pulling of veneer from under staples than when a smaller number of staples were used.

Boxes for two dozen No. 3 cans made of 1/8-in. veneer and with 20 staples per wire (six at top, six at bottom, and four to each side) averaged 30 per cent. more resistant than boxes with 14 staples per wire (4 at top, 4 at bottom, and 3 at each side). Boxes with 24 staples per wire averaged 25 per cent. more resistant than those with 20 staples.

It was also shown that staples connecting ends to cleats were very inefficient unless driven at a considerable angle with the grain of the end. Either broad headed nails or properly driven staples are effective in holding ends to cleats.

The tests on wirebound boxes showed that considerable care was necessary in the manipulation of thin veneers. Five-thirty-seconds-inch and one-eighth-inch veneer absorbs moisture very readily when exposed to a damp atmosphere and loses it as readily when brought into a dry one. Because of this sensitiveness it is desirable that boxes made of such material be exposed as little as possible to changing humidities in order to avoid shrinkage and swelling which splits and loosens the veneer from around the staples. The drying which sometimes takes place in a dry heated room is also sufficient to cause a marked brashness or loss of "life" in thin stock.

It has also been shown by Forest Service tests that there is also a loss of inherent shock-resistance when wood is dried to very low moisture content; that is, if lumber is dried down to, say, 5 per cent. moisture and then exposed to such climatic conditions that it reabsorbs to 15 per cent. moisture, it is less resistant to shock than lumber which has not been dried below 15 per cent. This effect is augmented if the lumber is dried by excessively high temperatures or low humidities. Of course, the climatic conditions to which boxes and box materials must be exposed are not subject to control, but drying to a moisture content lower than the average air-dry condition, 10 to 15 per cent. moisture, serves no useful purpose, except, perhaps, to lessen the shipping weight (and this will not be accomplished unless the shipping weight is taken soon after the material is dried), and it is likely to result in considerable damage by increasing the brashness, or decreasing the "life" of the material.

Resume

The revolving hexagonal drum box testing machine shown in Fig. 4 is quite efficient in determining the relative resistance to rough handling of various types of wooden boxes, exposing the weak features of their design and furnishing data on which to base specifications for satisfactory containers of the size for two dozen No. 3 cans and smaller.

The number of drops required to cause the contents to fall from the box, together with observations of the tests and of the condition of the box, and its contents, at various stages, may be taken as a measure of its resistance to rough handling.

The principal points brought out in these tests are:

Need for classification of box woods.

Need for much better nailing than is ordinarily practiced.

The superiority of cleated ends over end construction without cleats.

The bad effect of storing boxes in a dry heated room after nailing up from stock in a normal air-dry condition.

Mortising and Tenoning

By L. O. Hanson

Well do I remember when I was serving my apprenticeship. I had to mortise with a foot-power machine and cut tenons on a wooden-frame tenoner. In those days mortising was hard; it had to be done by the sweat of the brow and the muscle of the leg.

The mortising and tenoning machines of today are about perfect; any kind or style can be had. In the tenoning machine line you get single or double-end, light or heavy. With the mortising machine the collection is greater and more varied. An improved vertical, with boring attachment, is a very handy machine. Then we have the chain mortiser, which is the slickest thing you ever saw for the class of work which it was made to do; and the automatic hollow-chisel machine, the boring attachment arranged in such a way that the bit works through the hollow chisel. This machine is built principally for heavy duty.

One manufacturer of this class of machines claims that it combines the handiness of the old-style flat-chisel mortiser with a speed of operation four to ten times as fast as that type of machine. As the old-style machine requires laying out the work, sometimes boring previous to mortising, and cleaning out the chips, no one can afford to operate that class of machine if he desires a maximum saving of labor. I am satisfied that this class of machine is very handy; in fact the best for working wide sills, to make double mortises; also for end tenoning, gaining, boxes, etc. The cutting-off feature can be dispensed with in the case of end-tenoning sills.

So much for the machine; now for the work. Of course, it is understood that we are dealing with two classes of work. A man may be efficient in one and not in the other, for the reason that he never had an opportunity to learn both, but I think a good man on the mortiser should also be a good man on the tenoner, as the two are so closely related that it is really necessary.

The first thing necessary is to get the stock in proper shape to mortise and tenon, length, width, thickness, etc. The thickness is very important for the accomplishment of a passable job. The stiles, rails, etc., should be the same thickness throughout. Do not have one piece 1/16-inch thicker than the other; be accurate; have them all the same, as nothing else will do. Just imagine the stile thicker than the rail, and the time required to jack it off, all of which time is caused by carelessness, at the expense of the company or party for whom you work.

Be sure to have a face side to every piece, no matter how small, and that face side marked; keep the face side up against the guide when mortising, and down when tenoning. Another important feature is to fit the tenon to the mortise, not the mortise to the tenon. I have seen hours of time wasted by hammering, banging and chiseling, in order to get the tenon

into the mortise, all caused by not trying the tenon in the first place.

Another matter that should not be lost sight of is, cutting the rails so long as to have the tenon sticking through the rail more than one-half inch—just enough to cut off flush with the band saw to make the job pass inspection.

Operators of these two machines will find an improvement in their work if they will keep their cutters sharp and clean. The tenon cutters should have a good bevel to them and be clear of gaps; a short-bevel cutter will tear the stock up, especially if soft wood. The same rule applies to mortise cutters—plenty of bevel, and keep them sharp.

Practical Methods in the Furniture Factory

A Shaper Form that can be Used for a Wide Variety of Work—One Pair of Handles and Standards will do for Any Number of Patterns

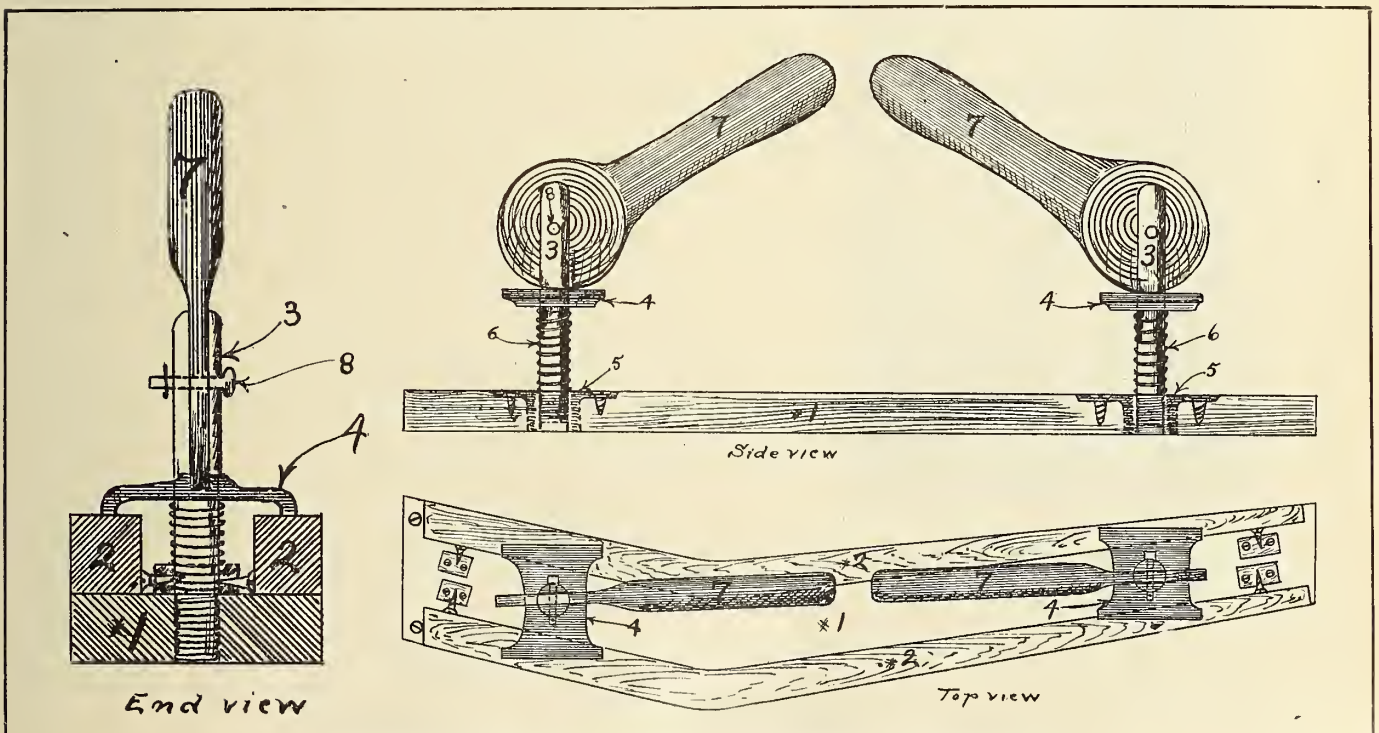
By W. J. Beattie

I have chosen for this month's issue a short article on shaper patterns. The illustrations show one used for shaping chair legs or similar pieces that it would be practical to use the idea on. As the small sketches have the parts numbered the reference to them will be easily followed. The two handles shown appear, necessarily, closer together than they would be in actual use. No. 1 is the shaper pattern, made preferably out of 5-ply stock and finished from 7/8 inch to 1 inch in thickness. Five-ply stock makes an ideal shaper form, and the wear-resisting qualities of the edges are a strong recommendation.

One edge of the pattern conforms to the face side of the leg and the other edge to the back side, the legs being transposed after the one edge is done, are finished together. The chair legs are indicated at No. 2. No.'s 3 and 3 are two upright iron standards of sufficient height of ½-inch or 5/8-inch round iron, threaded to go into No. 5 at one end, the other end being milled out to receive the eccentric levers No. 7. No.'s 5 and 5 are two drilled and tapped plates, let into the face of No. 1 flush and held there by two screws.

No.'s 4 and 4 are two grip plates having a hole in centre large enough to slip over No. 3 and they are slightly grooved to receive the edge of No. 7, which, having an eccentric edge, forces No. 4 down against the material to be held. The height of number four can be regulated by the thread on the lower end, so that the lever handles come to an almost horizontal position when the necessary pressure is put on. Then the shaper operator can swing his pattern from head to head very easily and safely. No. 6 is a coiled spring that fits over No. 3 and raises No. 4 clear of the material when the levers are thrown up.

The small blocks screwed to face of No. 1 and having adjusting screws in them, are very handy in setting the material to equalize the cuts off each edge. The pin, No. 8, is made to be removed easily in case of need. I believe that the above description, with the aid of the sketch, will be easily understood. It is quite practical to use such a pattern holder idea on material that may require shaping on one edge only, by simply having something of the same thickness as the stock being shaped to hold up the back end of No. 4. It is quite apparent that it is much quicker to



This shaper form will make a useful addition to the equipment of the furniture factory.

slip stock under the pressure grips and clamp down the levers, than it is to drive it on to a spur pattern, and then have to pry it off after the shaping is done.

One pair of handles and standards will do for any number of patterns, as they are simply unscrewed from No. 5 and are then ready to be attached to another pattern. By getting a quantity of No. 5 plates, and a few pairs of various lengths of No. 4, you can cover a considerable variety of work that it will be found advisable to do in such a manner.

The element of safety is a factor, as a man's hands are above the cutters, and the danger is practically nil. There is no necessity for the usual shaper guards; the ends of the pattern can be long enough so that the "run in" cannot possibly produce a kick, and it is quite obvious that without a spring guard pressing down on the material, a man can do more work and do it easier than when he has to overcome the friction caused by the pressure of the guard.

Don't for a moment think that we are advocating carelessness, or the doing away with shaper guards, but this is one of the instances where it can be done without such a charge being made. For larger stock, such as tops, etc., that have to be shaped on a form, the best points or spurs to use are flat headed stout bolts, having the nut let flush into the top of the pattern, the bolt sticking through far enough to be ground to a chisel point. This is much safer than a round spur point, as it holds the material to be shaped much more secure than the other style.

The word shaping should never be confounded with moulding.

To say that a piece of material has to be shaped, when it is simply run against the collar or a fence and molded, is a wrong term to use; it is simply moulded. Shaping is a term applied to a piece of material that is placed on a pattern and shaped to duplicate it, and is, of course, very frequently moulded at the same operation. Many men are guilty of such things who claim to know a considerable lot about factory work. You might say, "what does it matter if a manufacturing tag goes out marked shaped, instead of moulded?" or vice versa. It makes a big difference in many instances. That is one reason why it is wrong to use the terms out of place; and it is quite sufficient to prove the contention.

The shaper and its work may be referred to in a future article.

A Modern Handle Plant at Deseronto, Ontario

Illustrated Description of Plant of Dominion Hardwoods, Limited, which Started Last Month to Manufacture Handles on Large Scale

An important industry has been established at Deseronto, Ont., by the Dominion Hardwoods, Limited. The company started operations in June, 1916, to manufacture broom handles, pail handles, etc. The plant was only in operation a short time when it was totally destroyed by fire. Not discouraged by this misfortune the stockholders decided to rebuild the plant, with the result that on the 10th of January this year the company re-commenced operations in one of the most modern and best equipped plants to be found anywhere.

Mr. Charles Magee, president of Dominion Hardwoods, Limited, Deseronto.

The plant has a capacity at present of 45,000 broom handles per day, and 74,000 pail handles, and the company advise us that when the additional machinery now being constructed is installed, they will have one of the largest exclusive handle manufacturing plants in the world. The plant is situated on the Bay of Quinte. The company control nearly one hundred square miles of hardwood limits and are thus assured of a steady supply of timber.

There are two railroad sidings on the property, one connected with the storage room for the loading of the finished product, and the other, which is an inclined siding, for the unloading of logs. The facilities for loading and unloading logs are excellent. One man can unload a car of logs in 27 minutes. After being taken from the log storage the logs are unloaded into the bay. From there they are run by a jack ladder to the cut-off saw, where they are cut to the lengths required. When cut, they drop automatically to a small car, which when loaded runs down an incline track to the sawmills. These sawmills are built right and left hand.

The logs suitable for the different kinds of stock are sawn into boards, after which they are taken into the saw room, where they are cut into squares and rods for the manufacture of the various kinds of handles. They are then carried by automatic cars to the turning room and turned into finished stock, and after that they are taken to the rumbler or polishing room and polished by being placed in large drums which revolve and tumble the handles around, thus knocking all the rough edges off them.

After this polishing process they are taken to the painting or enamelling room and finished. By referring to the accompanying drawings, Figs. 3 and 4, an idea can be obtained of the layout of the plant. It is then an easy matter to follow the various processes necessary to turn out finished handles. The photographs show some of the machines used. Fig.

Fig. 1—Cutting lumber into small squares to be turned into handles.

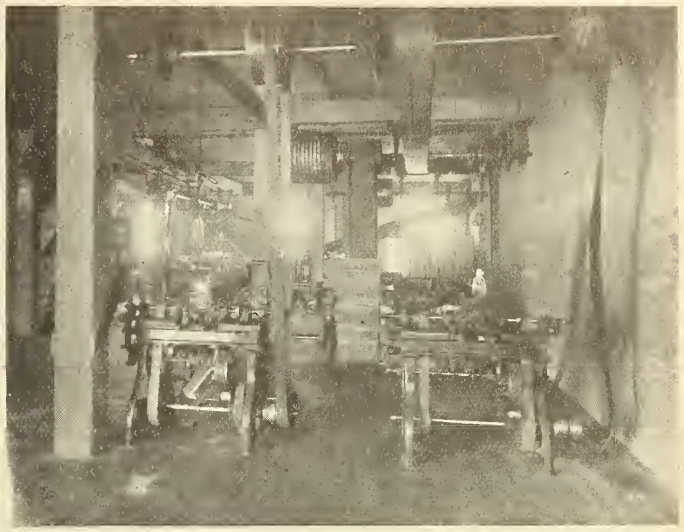


Fig. 2.—Automatic turning machine for turning handles up from squares.

1 is a view of the room where the material is prepared into small squares for turning. Fig. 2 shows an automatic turning machine for turning the handles from the squares. The woods used in the manufacture of the company's products are, birch, maple and beech.

The power plant consists of four large tubular boilers and a six hundred horse power engine. The plant was built under the supervision of Mr. Warren C. Rude, architect and mechanical engineer, of Covington, Kentucky, U.S.A.

The company was organized in March, 1916. The officers are: Mr. Charles Magee, president; Mr. E. McMahon, vice-president; Mr. H. E. McMahon, secretary-treasurer. Mr. F. C. Bate, Col. R. S. Lowe, and Mr. J. I. McCracken, together with the above mentioned officers, constitute the board of directors. Mr. James M. Rude is the manager. The capital of the company is $150,000.

The officers of the company are all prominent in business and financial affairs in Canada. Mr. Magee, the president, was at one time president of the Bank of Ottawa and also of the Union Trust Company, Toronto. Mr. McMahon is a member of a prominent Ottawa contracting firm.

The Gum Lumber Manufacturers' Association held a very successful meeting on January 20 in Memphis, Tenn. The president of the association, Mr. H. B. Weiss, called the meeting to order, and in his address he outlined a record of remarkable progress and told of the surpassing amount of work that was necessary to make possible what had been done. He also complimented the work of the advertising committee.

In his report, Mr. J. M. Pritchard, the secretary, said, "The conditions of the gum lumber industry at the present time, as compared to three years ago, show so much improvement that the greatest skeptic will be compelled to admit that the gum association is a success." Mr. Pritchard said further, that the association had received during the year 1916, 458 inquiries for gum lumber, amounting approximately to 42,000,000 feet. The report of the treasurer showed the association to be in a satisfactory financial condition. A number of interesting addresses were delivered at the meeting, one of which was by H. D. Tiemann, of the Forest Products Laboratory, Madison, Wis., on the kiln drying of gum lumber. This address is printed elsewhere in this issue.

"There is nothing succeeds like success," and there is nothing that will bring about success quicker than going about one's work in a businesslike way.

Good and honest work is an absolute necessity if you hope to build up a permanent business.

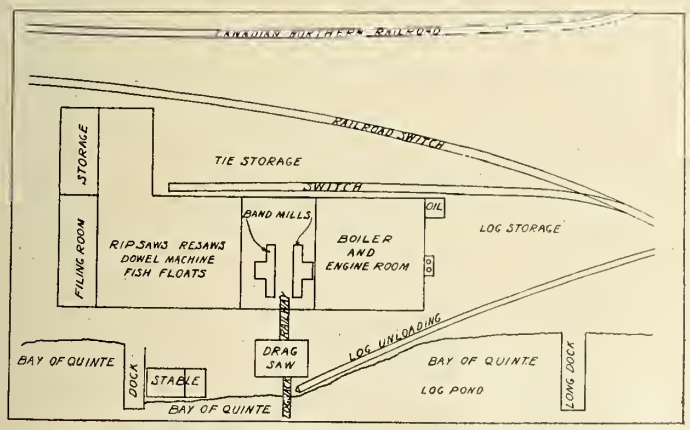


Fig. 3—General layout of the plant of Dominion Hardwoods, Limited Deseronto, Ont.

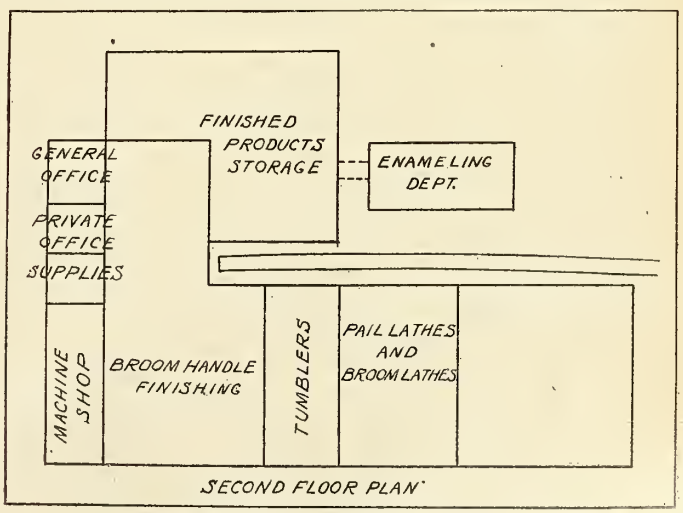


Fig. 4 - Second floor plan of the factory of Dominion Hardwoods, Limited, Deseronto, Ont.

The Depreciation of Plant and Machinery

An Important Item that Should be Provided for in Factory Accounts—Rates to be Set Aside for Different Classes of Equipment

By W. Alexander

There are numerous instances where the owners of manufacturing plants are only now beginning to realize that their system of keeping accounts is entirely inadequate. Indeed, in many cases they do not possess anything that could by the greatest stretch of the imagination be called an accounting system. The business has developed from a small beginning, and generally, the owner being himself a practical man, has left the office almost entirely to a bookkeeper, supposed to know all about books. As the business grew the bookkeeper grew also, but often only in importance, not in knowledge. When the work became too much for him, perhaps he would be given an assistant or two. This generally made matters worse, as, not having any knowledge of the fundamental principles of keeping accounts, he certainly could not direct the work of others.

There are, of course, some notable exceptions, where bookkeepers in positions similar to the one just outlined, being possessed of ambition, and the desire to succeed, have studied accounting problems, often, I might add, under great handicaps, and "made good," many of them finally becoming managers.

It is quite apparent that it would be impossible to deal with the subject of accounting in one article, and even if it were possible it would hardly be advisable, as the nature of the business and individual conditions have to be considered. It is advisable, however, either to have a competent accountant on the staff or to engage one to work out a system and instruct the party that is to have charge of the work.

One feature of accounting that is not taken seriously by some manufacturers is the matter of depreciation. Some regard it as more or less of a "bogey," while others that consider it are very often at a loss to know how to make proper provision for it. The purpose of this article, therefore, is to point out just exactly what depreciation is and outline a method for taking care of it.

Depreciation means the ordinary wear and tear that is bound to occur to the physical assets (plant, machinery and tools) used in any enterprise. The fact that appraisal companies, whose business it is to make valuations of manufacturing plants and buildings of all kinds, and whose figures are nearly always accepted in case of a legal dispute, make allowances for depreciation of both buildings and equipment should be sufficient evidence that depreciation is a factor to be considered.

It is obvious, however, that firms desirous of showing large profits, or profits where they do not exist, will argue against any provision being made for depreciation. They will argue that there are circumstances where a depreciation account is unnecessary. One of the cases they will point out is where large sums have been spent for repairs and renewals. Such arguments are generally based on improper reasoning, as an examination of the facts will show. No matter how much is spent for repairs and renewals, the ordinary wear and tear will accrue just the same, and it is that ordinary wear and tear that should be provided for by means of depreciation accounts.

That the wear and tear of machinery, tools, etc., is a part of the cost of production is evident. Also, the damage to machines or equipment through an accident must be taken into consideration. Then, if through the installation of a newly invented machine, another comparatively new machine is rendered obsolete, a waste occurs, and this also forms a part of the cost of production.

A difficulty arises in a great many plants from the fact that depreciation is largely a question of individual discrimination. The principal thing to be borne in mind is that we have to estimate the extent of the depreciation as accurately as possible and charge the amount to profit and loss. This simply means that the net profit will be decreased by that amount, and consequently, the equipment will in the long run be replaced out of earnings.

Thus far in my remarks on the subject of depreciation I have only considered fixed assets. Manufacturers must always bear in mind, however, that in some cases current assets are just as liable to depreciate as fixed assets. For instance, certain items of raw material, also finished and partly finished stock, together with goods in process of manufacture, are often subject to depreciation as much as plant, machinery and tools.

Having conceded the importance of making due provision for depreciation, the question then arises, how best to make that provision. The most important point is that the profit and loss account must be charged with a sum sufficient to cover the depreciation in the value of the assets, and this sum must be distributed so that the charge from year to year will be upon some equitable basis. To accomplish this a debit must be made to profit and loss and a corresponding credit to an account headed "reserve for depreciation."

In cases where raw materials and partially finished stock are liable to depreciate, it is generally necessary to provide a separate reserve, as these would rarely be subject to the same depreciation as plant and machinery. This latter reserve is not generally used by accountants in furniture factories or woodworking plants, as there is seldom any depreciation of the raw materials used in these industries.

Various methods are adopted for charging depreciation against profits to cover the number of years which constitute the life of the assets. In the case of buildings or long term leasehold properties, the method usually adopted is what is known as the annuity system. That is, to write off to revenue each year an equal sum sufficient at the expiration of the life of the asset to reduce such asset to zero or its "scrap" value, after debiting the asset and crediting revenue each year with interest at an agreed rate, upon the amount for the time being invested in the asset in question. As the gross charge in respect of depreciation is constant, whereas, the credits to revenue in respect of interest diminish as the asset is written down, the net effect of this method is to charge an increasing sum to revenue as years go on. The reason and justification for charging an increasing sum to revenue is that the depreciation installments remaining in the business increase the working capital of the enterprise.

The increase in the installments represents the amount of interest that might have been earned on the former installments during the period in question if such installments had been taken out of the business and invested at a fixed rate per cent.

With such items as patents and certain property held by lease, where the life is known and where the asset has no "scrap" value, the method adopted is to write off an equal portion of the cost each year.

For plant and machinery, a good method is to write the asset down from year to year by deducting an amount for depreciation at a fixed rate per cent. upon the balance remaining to the debit side of the account at the beginning of the year. By using this method the charges against revenue become gradually less as time goes on. The charges are heaviest in the early years and are gradually reduced.

For loose tools, etc., such as hand screws, hand clamps, and other tools used in woodworking factories, the most satisfactory method is to revalue them from time to time and treat any decrease in value as the realized depreciation for the year. By this method the charges against revenue in successive years will be very unequal as a reduction in the market value of most articles must correspond with true depreciation as measured by the amount of use that has been made of the asset during the period under the review. A good time to do the revaluing is when the annual inventory is being taken.

The next step is to decide what amounts are to be set aside for depreciation on these different items. This also is a matter where individual conditions must be considered. Authorities, however, have agreed on the following figures, and they are usually accepted. The minimum rate of depreciation on engines is 7 per cent., and the maximum rate 12½ per cent. On boilers, assuming the conditions to be favorable, the minimum rate should be 10 per cent. upon the reducing annual balance, and the maximum 15 per cent. The depreciation rate of shafting if it is properly lined up so as to avoid undue friction, should be approximately 5 per cent. per annum on the reducing balance, and should not exceed 7½ per cent. Belting should be treated separately. Coming to the item of general machinery, there are numerous types of machines, some of which are never likely to be entirely superseded, and others which are likely to be replaced by modern inventions at an early date. In an average factory, if all machinery be classed together, a 7½ per cent. rate on the reducing balance will, as a rule, be sufficient for wear and tear, if the machinery be carefully worked—not on over pressure—and kept constantly in thorough repair. The maximum rate should be 10 per cent.

Special machinery, as a rule, requires a very heavy depreciation, a minimum rate of 20 per cent. and a maximum rate of 30 per cent. Under special machinery might be classed certain machines that are used for making special turnings for furniture. The life of these would, of course, depend on the changing of furniture styles. Most of the automatic turning machines, however, can be utilized for quite a variety of work and would therefore be good for their natural life. They would thus come under "general machinery" instead of "special machines."

Tools, as a rule, should be revalued as mentioned previously, and moulds and patterns should be depreciated at a minimum rate of 25 per cent. and a maximum rate of 33 1/3 per cent. Most furniture factories have a lot of money invested in forms and patterns, and these should be provided for. Patents and copyrights, while they have a legal existence for a specified period of years, nevertheless, due to modern inventions and the rapid changes, they rarely are used throughout the legal life. As a rule they are superseded after a period of a few years. The best plan to follow is to limit, on the books at least, their existence to half the legal life.

Electrically Equipped Furniture

What looks like an excellent plan to create new business for furniture manufacturers and incidentally for manufacturers of electrical specialties and suppliers of electric current is outlined in a letter being sent out to furniture manufacturers by the Commercial Section of the National Electric Light Association. The plan has for its purpose the development of the manufacture of furniture equipped with sockets, etc., for the attaching of all kinds of electrical conveniences. The association points out that the manufacture of electrically-equipped furniture would in all probability create a strong demand, and thus have a tendency to render obsolete furniture already existing in homes, hotels, etc. The plan appears to be worth considering.

The letter is substantially as follows:

Will you kindly advise us, at your earliest convenience, whether your company has ever manufactured furniture in which was built, or connected with after same was manufactured, lighting equipment or outlets for the use of electrical cooking appliances, heating pads, curling irons, hair dryers, etc., etc.

As you are probably aware, furniture of this general character has been built, especially for use in hotels. For example, lamps have actually been built in (or connected with after manufactured) chiffoniers, dressing tables, and bureaus, the lamps in some instances being built on both sides of the mirrors, and in others, a single lamp being placed over the centre of the mirror. Also, in furniture of this character outlets have been built to screw in plugs to connect with electric curling irons, hair dryers, and similar electrical equipment, the furniture being wired so that same can be plugged into the baseboard receptacle.

Furthermore, beds, both wood and metal, have had lamps actually built in the head portion for reading and other purposes, and have also been equipped with a socket to accommodate an electric heating pad, the beds being wired so that attachment could be made to a baseboard outlet.

Bathroom cabinets equipped with a mirror for placement over the washstand have also been equipped with lamps, either on both sides or, over the centre portion of the mirror, to provide suitable illumination for shaving, hair dressing, etc.

Music (phonograph) cabinets have been equipped with a small lamp, lighted when the top of the cabinet was raised, to provide local illumination to properly adjust recording needle, etc.

China and glass cabinets have been internally equipped with lighting equipment for constant or intermittent burning, in the last example the lamps being automatically lighted when the doors were opened and extinguished when the doors were closed, in order to provide illumination at the time that china and glass were handled, and thus avoid breakage, such cabinets being wired so that they could be readily connected with available baseboard electrically wired outlets.

Kitchen cabinets have been provided with suitable electric lamps so that the users of same would have adequate local illumination available, the cabinets being wired to connect up with baseboard, or otherwise located, outlets.

(Continued on page 54)

THE FINISHING ROOM

The Painting and Finishing of Passenger Cars

By Thomas Marshall, foreman painter Canadian Pacific Railway, Montreal, P.Q.*

The history of paints and varnishes dates back to the dark ages. Even the old Egyptian mummies were wrapped in canvas and sealed with specially prepared gums or varnishes to protect them from the atmosphere; and just as to-day paints and varnishes are used to protect wood and metal surfaces, they also perform two functions, protecting from weather and beautifying the article they are applied to.

In my paper this evening, dealing with paints and varnishes, it would be folly on my part to undertake to go into the questions fully, as there can be a great many papers written on the subject with no end of discussion in connection with them. For instance, there is the chemical end, which treats of the manufacturing of chemical colors and the analysis of the various kinds of paints and varnishes. Then there is the manufacturing, grinding and toning of the colors, and, last but not least, the application of them, and the many ways in which they are used, and the various articles they are used on. So I will only try to give you some idea of how they are used in connection with the railway cars and coach painting, and even then it will only be in a very limited way, as it would otherwise take up a great deal more time than you have to spare this evening.

I will venture to say, that if you were to ask the average manufacturer of automobiles, carriages, or railway coaches, etc., whose product requires a high grade finish, what part of the factory causes him the greatest trouble and annoyance, he will invariably say the painting and finishing. It is a well-known fact that paints and varnishes are very much like the human system; they are affected by the weather conditions, such as heat, cold, dampness, drafts, etc., and our climate during our "shopping" season is subject to changes and extreme conditions, any one of which may cause endless trouble to the painter.

One of the most essential principles in the finishing of wood coaches is to see that the wood is properly seasoned, kiln dried and painted on the under side with a good oil paint, as the least particle of dampness will cause more or less trouble. After this has been done, the succeeding coats are simply a question of skill; the main point is to see that each coat is properly treated, until the coach is finally completed.

Now, as every part of a coach is finished by various processes, we will start with the top or roof. Before the application of a new canvas roof, it should be covered on the under side with a specially prepared canvas paint. This should be composed of raw oil, zinc, oxide, carbon black and dryers. The canvas should be applied while the undercoating is wet and allowed to dry on the car.

The outside of the roof is handled in the same manner. The roof should have at least three coats, allowing 24 hours between each coat.

When the exterior of the coach has been prepared for painting, and after the priming coat has been applied, it is followed up with three or more coats of surfacer, which is very finely ground, and which provides a good smooth foundation for the color, on top of which is applied one or two coats of color ground in Japan or varnish. The car is then decorated, after which two or more coats of wearing or finishing varnish are applied.

The theory of the best known experts is, that you must keep each coat, from the priming to the finishing varnish, as elastic as possible, so as to ensure durability, because elasticity means durability.

The trucks and underframing of a car should be thoroughly cleaned and free from rust and grease, before your priming coat, after which the underframing is painted to prevent deterioration, the trucks are given one coat of enamel and one coat of finishing varnish. This constitutes in a very rough way the regular treatment of the exterior of a coach.

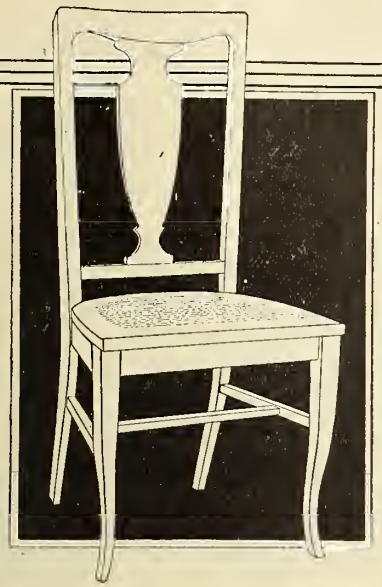
Finishing the Interior

The interior finishing of a coach varies, as there are many different kinds of wood used and each is usually treated according to its own peculiar nature. For instance, a different method is followed for maple than for oak, but the general method applies to all, such as the staining, filling and varnishing, rubbing and polishing.

Some very interesting discussion, I think, can be had on the question of using a flat varnish for interior finish. Personally, I have had splendid results from the use of a varnish of this kind. Its wearing qualities are the same as high grade finishing varnishes

Women "painters" in the car department at the C. P. R. Angus shops, Montreal, P. Q.

*From a paper read before the Canadian Railway Club at Montreal, Jan. 9th, 1917.



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stand unrivalled for richness of tone, strength, elasticity and practical working qualities.

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Let us know your conditions and we will make the exact enamels to suit your needs.

Made in America and the Best in The World

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and much time is saved by eliminating rubbing and polishing.

The practice for exterior painting, both wood and steel, is about the same, except that a different mixture is used for the priming coat. The primer for wood should have more oil; the primer for steel should have more varnish.

The following is the number of coats and time consumed in drying:

First operation is known as the priming coat and dries in forty-eight hours.

Second operation is known as surfacer or rough stuff, and dries in twenty-four hours.

Third operation, same as second except that on the top of this coat all nail holes are puttied with oil putty and all uneven parts and bruises are glazed with a glazing putty, allowing twenty-four hours to dry.

Fourth operation: Same method as the second operation, allowing twenty-four hours to dry.

Fifth operation: The car is now ready for rubbing or sandpapering. It has been proven that as smooth a surface and much quicker results can now be obtained with sandpapering, instead of the old practice of rubbing with rubbing block and water. This is due to the use of more refined oils and quicker drying long oil varnishes, and to the paint being ground much finer.

Sixth operation: One coat of color, consisting of color ground in Japan, thinned with turpentine and a small proportion of varnish, allowing anywhere from six to twelve hours to dry.

Seventh operation: Same as sixth operation.

Eighth operation: Lettering and decorating.

Ninth operation: A coat of railway body finishing varnish, allowing forty-eight hours to dry. This coat is the preserver for all paint underneath and should be of a good quality to insure durability.

Tenth operation: Second coat of railway body finishing varnish. This practice keeps car in shop from sixteen to eighteen days.

Cars painted in this manner, after having been in service twelve to fifteen months, are again shopped for varnishing. After the car has been thoroughly cleaned it is touched up, cut in with one coat of color, and is then given two coats of varnish.

In finishing of natural wood cars the operations are as follows:—

Before a sheathing is applied it is soaked in a vat of oil.

First operation: One coat of paint which is known as wood surface, composed of long oils and is very penetrating, allowing forty-eight hours to dry.

Second operation: Sandpaper lightly, after which the car is dusted off and filled with a filler composed of silex whitening and oil and thinned with turpentine applied with a brush and wiped off with excelsior and waste, allowing twenty-four hours to dry.

Third operation: One coat of wearing body varnish, allowing forty-eight hours to dry.

Fourth operation: Sandpaper lightly with a very fine sandpaper and then letter and decorate.

Fifth operation: One coat of wearing body varnish, allowing forty-eight hours to dry.

Sixth operation: Same as fifth.

Cars finished this way must be shopped at shorter intervals than painted cars, and this is not due entirely to the cracking or perishing of the varnish. For instance, when a car is painted all joints, especially those around battens and sills, are sealed with paint, which prevents water getting to the under side of sheathing, causing what is known as water-logged sheathing.

With varnish alone this could not be accomplished, and when only putty is used it finally shrinks and falls out, allowing water and dampness to penetrate the sheathing. Cars finished in this manner, after having been in service twelve months, and sometimes less, have to be shopped again for varnishing.

When the car has been thoroughly cleaned, it is often found necessary to remove sheathing, on account of it having become water-logged, due to insufficient protection from rain and dampness. When car is again ready for service it does not present a good appearance, due to contrast in color of old and new sheathing.

From five to six years is about the average life of the exterior finish of a car finished in natural wood, while a painted car should run from six to nine years before the exterior finish has to be renewed. The expense of scraping and complete renewal of the exterior finish of a natural wood car is much greater than of a painted car.

The processes of "scraping," "burning off," "touching up," "cutting in," and re-painting or re-varnishing might be described if time would permit, but I have thought it best to leave some of these subjects open for discussion. Much has been said as to the appearance of natural wood cars as compared to painted cars. This is also a question open to discussion.

Discussion Following Paper

In the course of the discussion which followed, Mr. Smart, of the Government Railways Department, described the methods of painting at the shops in Moncton, N.B., and stated that they prepared paints which are outside the manufacturers' regular productions. He also stated that flat varnishes had not proved satisfactory.

Mr. Dougall (of the Dougall Varnish Company, Limited) referred to the great importance of the proper use of paints and varnishes, there being no articles which depended so much upon proper use as paints and varnishes. The use of improper materials in varnishes tended to destroy the commodity. He contrasted the different results obtained under right conditions as to dryness and under those when dampness prevailed. He agreed that there had been an improvement within the last few years in the methods of coach painting. It was also apparent that better results could be obtained from the scientific manufacture of primers and fillers prepared in proper plants than by haphazard methods. With regard to scraping and burning off, he was of opinion that the latter operation was detrimental to the fibre of the wood. To sum up, the great necessity was to obtain good material.

Mr. Job (of the Milton Hersey Company, Limited) spoke of the excellent results from materials which formerly were regarded as adulterants. Great changes in oils, varnishes and pigments had taken place during the last fifteen years.

Mr. Holland (of the Holland Varnish Company, Limited) dealt with the subject of flat varnishes, stating that there were some good varnishes of this description on the market. One reason why the ordinary man preferred the rubbing was that he obtained a depth of tone which it was impossible to get with flat varnishes. He was very sorry to see the abolition of the natural wood car, which looked very attractive. The railway companies and the manufacturers should work in harmony; the former could help the manu-

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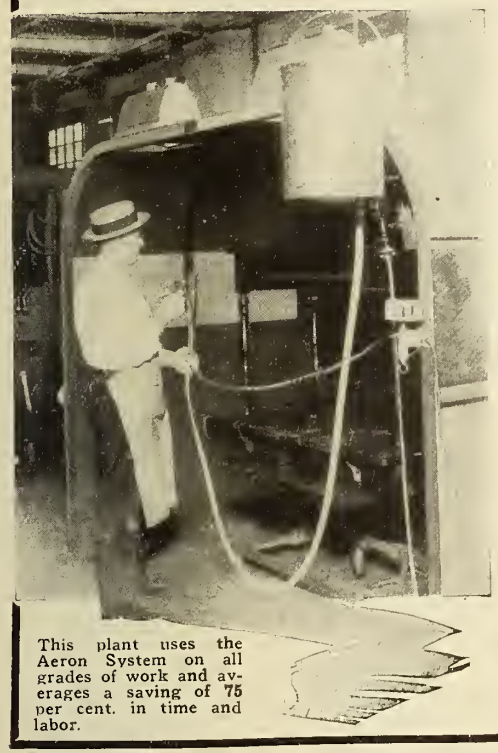

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facturers, and the latter believed that they could give assistance to the railways. He said that it paid to put a good finish on the cars. He also suggested that the spraying of a waterproof finish was a good practise, as the cars could be slushed off with water at the terminals. To obtain the best results, the priming coats should not be rushed; other coats might be rushed, but not the priming coats, as otherwise the results would be unsatisfactory. The proper care of the cars at the terminals meant durability. As to the relative merits of varnish removers and scraping, each method had its own use, according to conditions.

Mr. Van Buren (of the Canadian Pacific Railway) referred to the considerations which influenced his company in discarding the natural wood finish cars. It was, he said, impossible to get uniformity in the cars, and to burn off the varnish. The company had been making some service tests of varnishes, and they were slightly disappointing to him. They had obtained no great satisfaction from varnish removers, as, although they removed the varnish they did not get rid of certain stains.

Finishing Golden Oak

By "Finisher"

The cleaning up of quarter-cut oak that is to be finished golden has a lot to do with the clearness of the finish, as has also the color of the wood itself. It is well to remember that oak never gets lighter during the process of finishing. When a nice clear flake is desired, the surface of the wood should be sandpapered carefully, gradually reducing the number of the paper until no scratches are to be seen. If any scratches are left on the surface the stain will get in them and show dark.

A good clear finish is made by staining first and then filling. Do not use a combination stain and filler. There are a number of stains made by the makers of finishing materials that will produce good work. If, however, it is desired to make one's own stain, the following formula will be found satisfactory. The proportions may be changed to secure the desired shade.

Dissolve 1 ounce of oil yellow in 1 pint of turpentine, and dissolve 4 ounces of oil black in 2 quarts of turpentine. The dissolution of these materials may be hastened if a hot water vat is at hand. After the oil yellow and oil black have been thoroughly dissolved, pour them into 1 gallon of good turpentine asphaltum. This formula will produce a beautiful, rich shade of golden oak stain of about the same consistency as that supplied by manufacturers of finishing materials. The stain may be reduced by using a solution composed of equal parts of turpentine and benzine.

Apply the stain evenly and not very heavily, with either a rag or a brush. The rag will be found best for flat surfaces. If the stain is not applied with something that will let it off evenly, it is liable to be taken up too rapidly by the soft absorbing portions of the wood, in which case it will not dry properly and will ooze out after the goods are filled and varnished.

If the stain is properly applied, it will dry sufficiently in from half an hour to an hour to permit of filling. The filler is an important item in the making of a nice, clear, clean golden oak. If a real light colored flake is desired, the coloring matter must be omitted from the filler. If a colored filler is used the coloring matter must be in the pigment. The best filler is made of silex, and the more finely it is ground the better. Silica also makes a good pigment for oak filler.

Always make filler at least twenty-four hours before it is required for use, but it is not well to make it too far ahead, because it works hard and stiff when it becomes old, especially filler containing Japan. The writer never makes up more filler than will last for about ten days. The proportions given in this formula can be used for any quantity desired; 4 quarts pure boiled linseed oil; 4 quarts pale brown japan; 2 pounds Vandyke brown ground in oil. Stir these ingredients together and add enough silex to make a stiff dough.

The filler should be kept in the dough state until required for use. Quantities required for immediate use may be reduced to the proper consistency with benzine. Paste filler can be reduced to the desired consistency quickly and easily if only a small quantity of benzine is added at the start. In filling oak, the filler should be well brushed into the pores of the wood, otherwise it will pull out during the process of wiping off. The filler should be allowed to stand until it has dried flat all over; and then the surface of the wood should be cleaned off with sea moss, excelsior, or rags. In this connection the writer strongly advises readers not to use the rags sold in bales as wipers, as they are disease carriers.

If work is stained and filled in the manner described here, golden oak having a nice rich brown background and a nice light flake will be obtained. In order to preserve this clearness during the balance of the finishing process the work should receive a coat of white shellac, or a pale pigment surfacer may be used. A pale varnish should then be used for the "bodying up" of the work.

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Veneers and Panels

Methods of Filling Holes in Core Stock

The following question, received from a correspondent, was submitted to a number of practical men for their opinion. We publish some of these opinions below. If any others of our readers have any suggestions to offer regarding the filling of holes in core-stock we will be very glad to have them communicate with us.—Editor.

Montreal, Que., Jan. 2.

Editor Canadian Woodworker:—

Can you tell us the best method of filling up small holes in core stock so that a perfect surface for the veneer will be obtained? We have tried several mixtures, such as sawdust and glue, and finely powdered charcoal and glue. The latter we have found to be the best, but it is not entirely satisfactory, as sometimes depressions show up on the surface of the work after the veneer has been laid. Perhaps some of your readers will be willing to tell us how we can secure a good job at a minimum cost.

B. F.

Answer No. 1.—I may say that old newspapers boiled to a pulp, with a little glue added, should make a satisfactory filler for core stock. If the stock is only single veneered, there is always danger of these depressions showing; however, let your correspondent try this filler. Give it a chance to dry thoroughly before laying the veneer.

If the depressions or holes are very deep a plug of wood is the only satisfactory thing to use.

I have found charcoal and glue satisfactory, but only by allowing the mixture to thoroughly dry and then toothing or rasping it down flush. I hope this reply will be of some use to your correspondent.

Lewis Taylor.

Answer No. 2.—The best method I have found for filling up holes in either core stock or the surface is to make a putty composed of plaster of Paris and shellac. A touch over with sandpaper, after filling the hole, brings it to a level, and unless it is a very large size hole it remains true and takes the glue the same as the wood.

This composition has many advantages, as it is easily made, easily kept, hardens quickly and well, and is easy to clean up. I prefer it to any composition with glue in it. There may be some question as to cost of the shellac, but I have seen plaster of Paris mixed with water and used for this work with good results. It hardens very quickly, however, and has not the same grip on the sides of the hole. I have also seen it mixed with oils, vinegar or other liquids, and they had all their good and bad points.

K. McGilvray.

Answer No. 3.—In regard to filling up small holes in core stock, we use plaster of paris mixed with cold water like a light putty. It sets very quickly; therefore, I just prepare a small quantity at a time, using a glazing knife to apply it. I use it for small holes and good sized knot holes as well. When dry it can be scraped off level and it will leave a good even surface, and will not shrink with the drying out of the glue. In filling a knot hole that goes through the core stock, fill from both sides. After using this as a filler for a few times, you will find good results. I trust that this will prove satisfactory.

Subscriber.

Answer No. 4.—The most satisfactory method of filling up small holes in core stock for furniture work is to use powdered charcoal and glue. This, however, should not be made too thin, as trouble will generally result. Make the filler good and stiff; give it time to dry out thoroughly; then sand or tooth the core stock. Personally I have great faith in toothing. If sanding is desirable sand with a very coarse sandpaper, after which apply the veneer; give the veneered stock time to thoroughly dry out and there should be no trouble.

I have seen core stock "plastered" with sawdust and glue, or charcoal and glue, with more glue than anything else, and then before these fillings had shrunk out properly the stock was sanded and toothed down and the veneer applied, the sequel being that the shrinkage continued after the veneer was laid. Thus, there could hardly help but be depressions in the finished product. Care should therefore be taken to see that the fillings are dried out. Again, the face veneer should always be applied to the best side of core stock. This can easily be done by marking the edge of core stock, say, with a saw.

The above method of filling will prove satisfactory for small holes if handled properly. Large holes should be plugged with wood, always.

A really good filler can be made by taking fine sawdust and steeping it in water for one week, afterwards boiling it for a little while, when it will form a cake; mix with a little glue as required, and it will be found that this filling will not shrink. This filler is used by large shipbuilders for the filling in of holes that are made in the fine interior of the large liners. We use this method on our high grade work.

Core stock that has become bruised by dirty rollers of the sander or in any other way will show the depressions when finished. Some factories are now sponging their core stock before sanding or toothing it. This takes time, but in the end it pays.

Foreman.

Answer No. 5.—Assuming you are using what is called sound wormy chestnut for cores, a good mixture, and a cheap one, is made of a very thin solution of glue and plaster of Paris. This is mixed to a consistency of reasonable body and applied so as to force it into the holes. As plaster of Paris sets quickly, it is only practical to mix a small quantity at once, but as this can be readily done, very much filling can be accomplished in a short time.

The plaster of Paris sets hard as a rock in a short time, and there is no subsequent shrinkage. Run the

cores through the sander to clean off the surplus filling, using the coarse drum only. This has the effect of a light toothing, and makes a good surface for gluing.

Hope this will be of practical value.

W. J. Beattie.

New Electric Edge-Veneer Trimmer

A new device, recently perfected, is offered to the furniture manufacturer for accurately and economically trimming edge-veneers. An electrically-driven saw replaces old-fashioned and unsatisfactory methods. One man with this ingenious tool does the work of two or three using draw-shave and rasp. Thus it is a big factor in helping the furniture man keep ahead of rising costs. The operator handles the tool as though it were a flat-iron—simply slides it along the edge of the projecting veneer, which is trimmed off perfectly smooth and uniform; and there is no danger of "digging in." The saw is adjustable to bring the cut absolutely flush with the surface. Curved edges and corners are reached as easily and accurately as straight work.

There is no installation expense connected with this tool. It is entirely self-contained, and comes complete with cord and screw attachment, which fits any convenient lamp socket. It consumes scarcely any current in operation, and this adds greatly to its efficiency. Can be furnished for either direct or alternative currents of 110 or 220 volts. Any factory doing edge-veneering can ill afford to be without this practical tool. It will "buy itself," through the labor it saves, in a few months' use.

Further particulars regarding this latest labor-saving invention may be had by communicating with the Mattison Machine Works, patentees and builders, 883 Fifth Street, Beloit, Wisconsin, U.S.A.

Veneering Ogee Stock

In order to have efficiency in the veneer department we must first have an efficient, up-to-date veneer room, and after that we need a man as foreman who, I contend, should have passed through all branches of veneer work and thoroughly understands the business—one who knows how to show another how to do work right, writes M. West, Sr., in "Veneers." There are some foremen who think they know it all, which is very wrong, as the writer has had ideas brought out before him by the most lowly helper in the department. We can always learn something new, no matter how old we are at the business.

In these days of modern equipment, when something new is coming out nearly every day, we might say, you will yet find in nearly all veneer rooms one or more of the old standbys, the screw press. We can hardly do without them in a factory making a large variety of work. Take, for instance, ogee glass frame stock, which most places do by handscrews—I mean stock from 1½ in. in width up. There is always more or less trouble with this kind of work, which the writer has overcome, and now veneers them as easily as flat work, by putting a thin glue size on the core before veneering (long enough to harden), and when ready to veneer, lay two pieces on each edge of caul board and pile up batch, using a caul board between every two pair. Of course, proper judgment must be used to not make too large a batch before pressing. When in press screw down slowly and tap each piece with hammer

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and you will see them slide in their place. Cross-veneered is just as easy as straight veneered (see Fig. 1). Your stock must be stuck to fit each other, and by above method we get good work and it is also done rapidly.

The redrier, if properly handled, will save many dollars in repairing and padding up checks and so on in the finishing department. We have at times some very crooked veneer which, if put in the drier in that

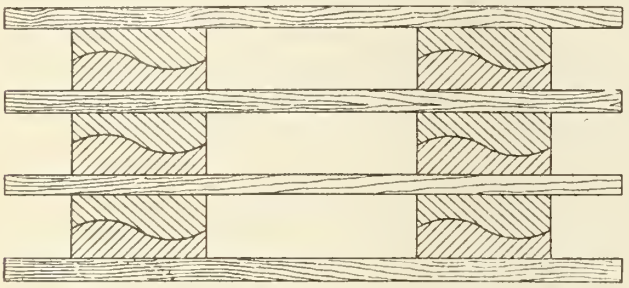

Fig. 1—Veneering ogee glass frame stock.

condition, will split at the ends. In the case of a large part of it, such trouble can be overcome by dipping each end in water about ½ in. and you will find you have no cracks to patch up. Some Circassian walnut, however, will not flatten out that way. We have experimented considerably on it and find the best method is to dampen the veneer all over and let lie for two or three hours. Then take about four sheets at a time and place between two pieces of rotary-cut, large enough to cover veneer and ⅛ in. thick. Place in redrier and dry in regular way. The drier can be changed for different thicknesses, so thickness of stock used does not make much difference as long as drier will take it in. You must get your stock heated through first time, and after that you simply take out veneer and put in more. It can readily be seen that this method is best for flattening walnut, as you use same pieces over again. They absorb moisture of veneer, which same moisture keeps veneer from splitting out, and at the same time drier is taking moisture from your stock and flattening the veneer. The most crooked and contrary piece of Circassian walnut can thus be used.

There are some who contend that a certain amount of moisture should be left in stock that is redried, but the writer's experience has proved to him many times over that the best and safest way is to take all moisture out. Never glue veneer; spread core only. Just as soon as you glue veneer you moisten it and it begins to swell. The more it swells the more shrinking it will do in drying and cause more checks to be doctored up, and it will never be a good piece of work at that.

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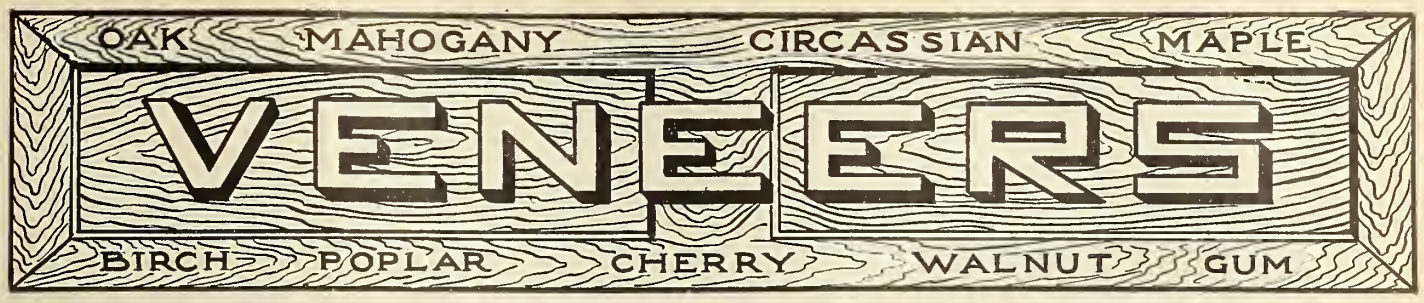

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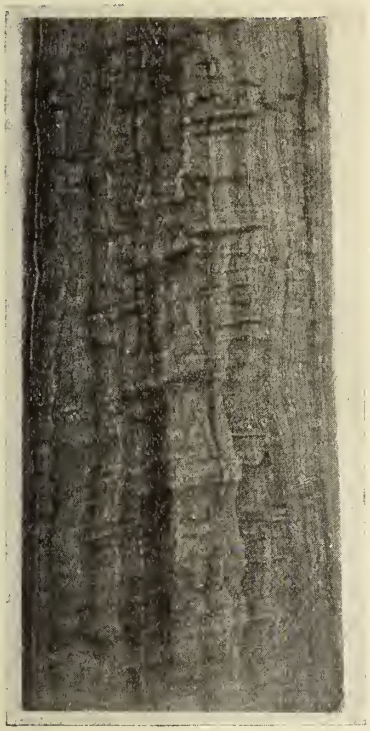

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Motor Drive for Woodworking Machines

By A. Snedeker

The specialization to which the construction of modern woodworking machinery has been subjected in order to obtain results commensurate with the improvements in the mechanical equipment of other industries, has tended to concentrate the attention of practical woodworkers on the various factors influencing the cost of production.

The rapidly-increasing adoption of electric motor drive in woodworking plants is due greatly to the success which this method has obtained in numerous installations, it having been demonstrated under severe service that the electric motor renders possible the most economical approach to the direct application at the machine of the total initial power developed. This fast-growing approval of the value of motor drive has been stimulated through the efforts of the electrical machinery manufacturers to meet the pointed needs of the lumber-working industry, by building motors adapted to the machines used in this line.

Usually the mill owner will only consider the change to motor power if by so doing he can see that he will thereby make a saving in the cost of production, either by increasing the amount of the product or by a reduction in operating expense. That electric drive combines all these features is evidenced by the following outline of the principal advantages it possesses when compared with mechanical drive:

It largely reduces the waste of power in transmission and increases production for a given amount of power generated. It improves the quality of the product and increases the factor of safety, both to operatives and machinery; also there is a reduction in the fire danger. It practically eliminates overhead shafting and belts, which consume quite an amount of power; also which carry many bearings that do not always get proper attention in the way of lubrication. It helps to profitably locate machines where uninterrupted movements of material are essential in order to avoid rehandling, with its additional expense. It effects a reduction in the amount of floor space required, and helps in cleanliness and safety in the mill.

With individual motor drive it is possible to operate any separate machine overtime without keeping the whole plant in operation. Woodworking machines are to a great extent operated intermittently; they are run at an enormous speed, the cut is quickly finished, and an off-load period shows between the completion of one cut and the beginning of the next. With these conditions the motor can be rated on a very favorable basis, as it will stand a temporary overload without harm.

The universal adoption of the alternating-current system of distribution has created a wide field of application. There are no moving electrical contacts on these motors, which eliminates the danger of sparks causing fire in a lumber plant. In fact, they can run covered with shavings or sawdust without any danger whatever.

In equipping a woodworking plant it is well to use the following appliances: The squirrel-cage induction motor, which is designed for constant speed work, where a moderate starting current is not objectionable, and the slip-ring induction motor for heavy duty and variable-speed service, requiring at starting a high torque with a minimum starting current, such as heavy planers, matchers, and resaws.

Motors are especially advantageous where they are used to drive individual machines. Where a single large motor drives all machines, and only part of them run at one time, there is quite a large loss of power in the shafting and belting or friction load; also the motor will be operated very often at half-load, owing to the intermittent running of the machines. When operating under these conditions the larger motor or group-drive application will be less efficient than when operated at normal load. Also in case of a breakdown of the single motor, the entire number of machines depending upon it must be stopped until it is repaired or put into commission. . These are some of the points against group drive that must be considered very carefully, as in many cases they govern the cost of production and quantity of output.

From records I have found that one-fourth to two-thirds of the power generated in some plants is used in driving the old-style line-shaft. Some of this is lost in bearings and some in tension of the belts. The greater percentage, however, is lost in the result of improper alignment of the line-shafting, as some plants do not go over the shafting often enough, and therefore the friction load steadily increases.

The application of the direct drive eliminates short-drive belts and keeps the floor entirely free, so the operator can work at his machine at any point.

In our plant we have about sixty-five motors running, and have adhered strictly to the direct individual drive in all applications where it is at all practicable, notwithstanding the initial cost being higher than would have been the group drive with belted connection. During periods of rush orders we are enabled to run as few or as many machines as may be necessary to get out the desired work, in whatever department the congestion may happen to be. No accurate figures regarding the saving in power which has been effected by the adoption of the motor drive in this plant have been obtained at this writing, but an estimate indicates that the cost of operating has been reduced probably 30 per cent.—Woodworker (Indianapolis).

Quenching a Fire in the Dry-Kiln

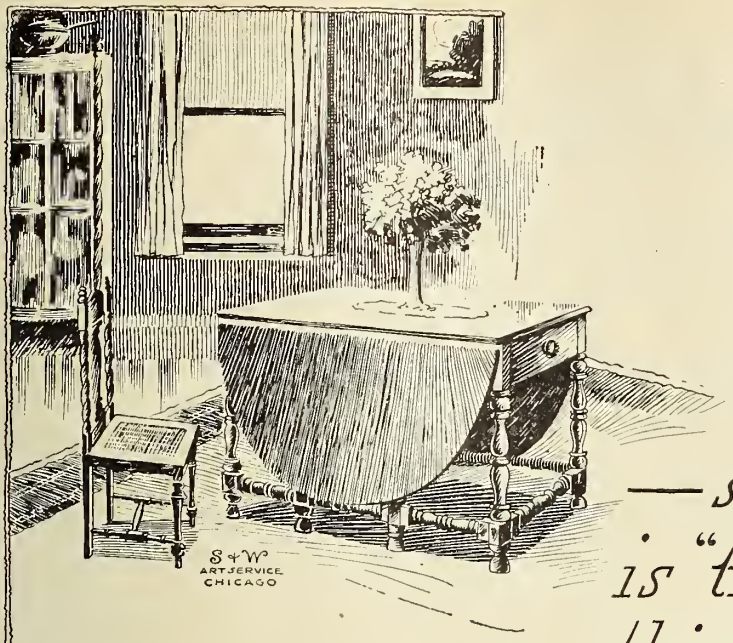
The manager of a large cooperage company in the United States whose plant was recently destroyed by fire—the fire having started in the dry-kiln—in writing to our contemporary, "Packages," makes a suggestion which will undoubtedly be of interest to the owners of woodworking plants. He says that steam jets should be put in the kilns and the valves located near the boiler, so that in case of a fire the kilns could be flooded with steam.

This sounds like a good suggestion, and we believe that a few steam jets arranged as indicated, together with the sprinkler system, would form a very effective means of quenching a fire and preventing it spreading past the dry-kiln.

Persistency

Persistency is a characteristic of all men who have accomplished anything great. No matter what opposition they meet or what discouragements overtake them, grit carries them through. Of such men people say, "You can't down them," and no higher tribute to possession of successful qualities could be paid.—Plaything.

Successful men are always enthusiasts. Your real enthusiast gets what he goes after, because he wants what he is after, and the man who really wants a thing, body and soul, gets it. He gets it, not because he wants it, but because he **works** for it.



QUALITY—

—said Noah Webster is "that which makes a thing such as it is"

BEAUTY of design, best of materials, perfect workmanship make of modern Period furniture prized heirlooms for our grandchildren, demonstrating the old adage that "the ***best*** is in the end the ***cheapest.***" And this is what we offer you in Lumber and Rotary Stock—***First Quality***—the cheapest because the best—

Oak, Gum and other Southern Hardwoods manufactured with care from fine, live timber, seasoned properly;

Gum Core Stock, Crossbanding, Built-up Panels and Drawer Bottoms perfectly cut, perfectly dried, staunchly crated;

All graded under the only rule we know—THE GOLDEN RULE.

To serve you today is to have you encore that service tomorrow.

Write now.

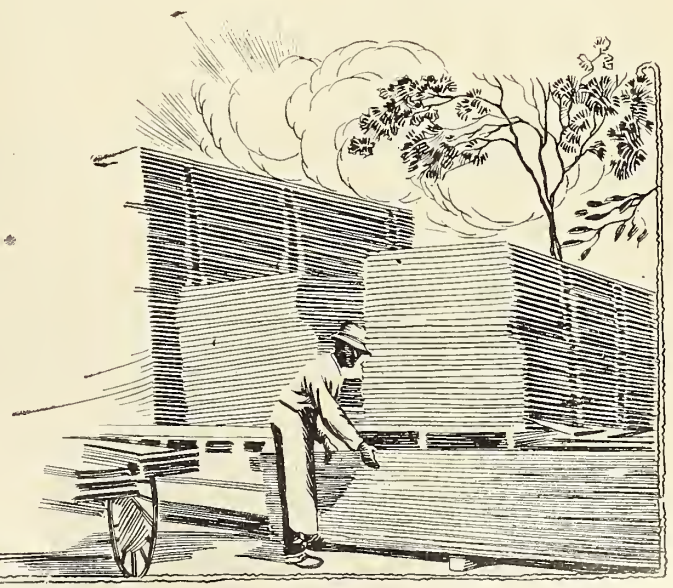
Anderson-Tully Company

Memphis Tennessee

Chicago Office:
GEORGE B. OSGOOD, Peoples Gas Bldg.

Grand Rapids, Mich., Office:
FRANK B. LANE, Houseman Bldg.

QUALITY MEANS ECONOMY



The Lumber Market

Domestic Woods

With the present condition of the lumber market, manufacturers that have been in the habit of placing their business with one or two lumber companies are fortunate, as a conversation the writer had recently with a prominent lumberman will show. When asked if his firm had any stocks of hardwoods on hand, he evaded the question. Later he said that while they had no hardwoods to sell to casual buyers, yet they had some stocks on hand.

The position of the wholesale lumber dealers during the past few months has not been altogether an enviable one. They have been obliged to ransack the country to try and buy up enough stocks at the mills to protect their future trade, and in this they have been faced with the problem of paying the increased prices asked by the mills without any assurance that they in turn will be able to dispose of their purchases at the necessarily increased prices which they will have to ask.

Present indications in the woodworking industry are that business is sufficiently firm to warrant manufacturers paying the increased prices, but there is a point above which prices cannot go and permit manufacturers to turn out their product at a profit. This point will, of course, be decided by the final purchasers of the product—the general public. Whether they will be in a position to pay higher prices for furniture and other manufactured woodwork will depend on the general prosperity of the country. This, it is pleasing to note, is satisfactory.

That furniture manufacturers and other consumers of lumber are fully alive to the situation is evidenced by the fact that they are endeavoring to "tie up" for their future supplies. We are informed on good authority that a leading piano manufacturer recently placed orders for eighty-two carloads of lumber. This seems a tremendous order for a piano manufacturer to place, but we believe very few will question the wisdom of the party placing it.

While the increased cost of logging operations has assisted greatly in boosting up the prices of lumber, yet we believe the decrease in production is the greatest factor. Just how serious the shortage in production is will not be fully realized till later in the year, when the cuts of the various mills are totalled up. The majority of the large lumber companies that conduct logging operations in the woods are operating on a very much smaller scale than usual. The only redeeming feature is that there may be a number of smaller companies operating in the interior sections of the country whose output will help to swell up the production. The fact that hardwood logs are unfloatable, and, with the exception of large companies having rail facilities to transport them to the mills, must be manufactured in close proximity to the point where the logs are cut makes this feature a little more promising. Wholesale lumbermen, however, are skeptical about much relief coming from this source.

Prices on existing stocks have shown no change since last month, but as we said before, the difficulty is to get the goods, even at the prices quoted, unless you are fortunate enough to have some lumberman who thinks enough of your future trade to supply your present wants. We give here the prices which are quoted at Toronto on car lots: White ash, 1sts and 2nds, 1½ and 2 inch, $60; birch, 1sts and 2nds, inch, $44; basswood, 1sts and 2nds, inch, $45; soft elm, 1sts and 2nds, inch, $40; rock elm, 1sts and 2nds, 1½ and 2 inch, $55; soft maple, 1sts and 2nds, inch, $33; hard maple, 1sts and 2nds, inch, $40; Douglas fir, No. 1 and 2, 1 inch clear, $44.50.

Imported Woods

In the United States, both northern and southern hardwoods are firm in price, with no tendency to decrease. One of the most important of the southern woods is gum, and it was brought out at a recent meeting of the Gum Lumber Manufacturers' Assn. that the present prices of this wood are, if anything, favorable to the seller. Also the notable increase in sales for the year 1916 over the years immediately preceding would seem to indicate that the present prices are likely to be maintained. The prejudice that formerly existed on the part of a large number of manufacturers against gum has largely been eliminated since the association undertook the distribution of authoritative information on the proper methods of handling it. With the elimination of the prejudice, gum has become a popular wood and for that reason is likely to maintain its price.

Oak is another imported wood that is used extensively by the woodworking industry. Stocks of this wood have been slightly increased during the past month, but as the orders have also increased there has been no alteration in price.

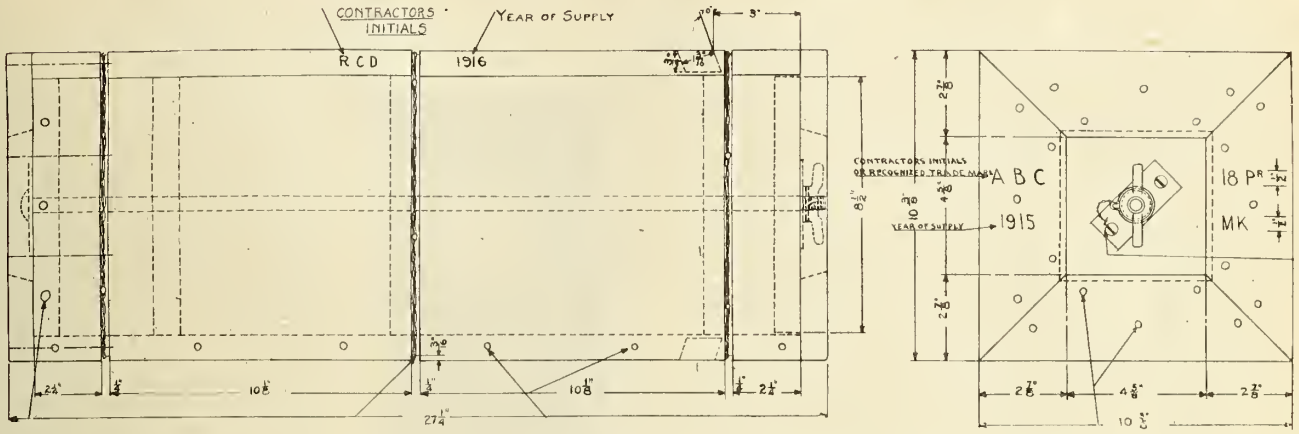
Coming to the northern hardwoods, the scarcity of maple in the United States is so pronounced that birch is being substituted wherever possible. In cases where it is impossible to make the substitution, maple is selling at top notch prices. In some instances the price of maple flooring rivals that of oak. Poplar is still maintaining its price. This is probably one of the most popular woods there is for core stock for veneering, and consequently it is always in demand. Stocks of chestnut have shown a slight increase, but on the other hand so have the orders; therefore, the price is firm.

Practically sixty per cent. of all basswood stocks on hand in the United States are reported to be sold, and considering that the stocks are much below normal, this means steady prices, with possibly a slight increase. The increased demand for birch, caused by the shortage of maple, has resulted in a large reduction in birch stocks. Reliable authorities state that approximately forty per cent. of the stocks of birch on hand are sold.

It may be safely said that there is very little probability of any of the items on the list of imported woods being reduced in price. A feature of the lumber market in the United States, as gleaned from some of the authoritative lumber journals, is the apparent willingness of the woodworking trade to contract for their future supplies. The scarcity of stocks in some of the leading woods is leading manufacturers to turn their attention to the lower grades. The consequence is that practically every item on the hardwood list is firm.

Current quotations in the Boston market are: Basswood, $45 to $48; maple, $45 to $47; plain oak, $63 to $65; quartered oak, $88 to $91; sap birch, $51 to $54; white ash, $56 to $60.

Bethlehem Shell Box Hardware



Galvanized Tie Rod, Lid Plate, Bottom Plate, Wing Nut, Split Ring. Chain and Cotter Pin.

Sole Selling Agents for Toronto Lock Mfg. Co.,
(who have been making Shell Box Hardware and Supplies for two years)

Double Stranded Galvanized Wire, Galvanized Staples, Nails, Wood Screws.

Large Stock—Approved and Inspected Goods

WRITE FOR PRICE AND SAMPLE

Your profits in the manufacture of shell boxes depend upon the efficiency of your factory and your ability to purchase supplies that are right in price and quality. The repeat orders which we have received are proof of the satisfaction we give our customers.

Try Us for Special Made-to-Order Hardware

Anything and Everything in Hardware

THE VOKES HARDWARE CO. LIMITED

40 Queen East

Toronto - Canada

Machinery Company of America Catalogues

The Machinery Company of America, Grand Rapids, Mich., U.S.A., have published a catalogue of their saw and knife fitting machinery under the name of "American Blue Book, No. 25," which will be found to be of great interest and value to all mill and factory operators, especially to skilled saw filers. The catalogue, which consists of 240 pages with a great number of illustrations, is in a handy book size, well bound and attractively gotten up. It would not be possible to give an adequate description of the catalogue in words. Those who are interested in equipment of this type should write to the company for a copy, and we feel sure that they will find it of definite value to them in their work.

The Machinery Company of America are distributors for Baldwin, Tuthill and Bolton, Grand Rapids, Mich.; Covel Mfg. Company, Benton Harbor, Mich., and Hanchett Swage Works, Big Rapids, Mich., all of whose products are widely known and of the highest standard. The catalogue contains an introduction giving valuable advice to customers regarding terms of sale, methods of shipment, freight rates, etc. In connection with each of the lines illustrated in the catalogue a detailed description of all its important parts and functions is given, together with prices. The information thus included in the book is of much practical value. At the conclusion there is included a very complete index and an index of code words for telegraphic and cable use.

The Machinery Company of America publish, in addition, a wide variety of catalogues, including the following:—A 64 page catalogue of Knife Grinding Machinery; an 80 page catalogue of Filing Room Machinery suitable for saw, shingle and cooperage mills; an 80 page catalogue of Filing Room Machinery suitable for woodworking plants, and a 28 page catalogue of Filing Room Machinery suitable for distinctive metal sharpening requirements. They will be pleased to receive requests for copies of any of these from our readers.

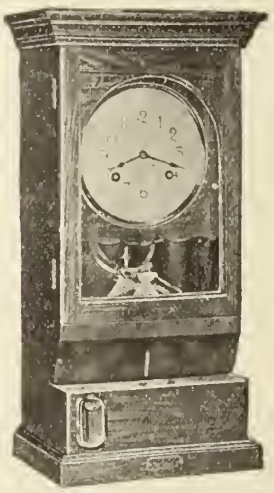
Death of E. P. Morden

We regret to have to announce the sudden death of Mr. E. P. Morden, who was well known to the woodworking and furniture trades of Canada in his capacity as Canadian sales manager for the Cyrus C. Shafer Lumber Company, of South Bend, Ind. Mr. Morden was a native of Cairo, Ill., but for the last two years he had resided in Toronto. Just a few weeks previous to his death he had gone to South Bend to the head office of his company. From there he intended keeping in close touch with the Canadian trade by periodical visits and by correspondence.

Maple in the Shoe Industry

Few realize the important part that wood plays in the manufacture of shoes. Practically every shoe is shaped over a wooden last, the life of which, owing to the very rough usage and the frequent changes in styles of footwear, rarely exceeds one year. About twenty million lasts are produced annually, at a cost of over one and one-half million dollars. The greater portion of these are made from maple, the price of which has advanced to such a degree that the manufacturers are forced to find a suitable substitute or to decrease their manufacturing costs. One of the most expensive items of the manufacturing process is drying the wood. At present the rough-turned last blocks are air-seasoned under cover for several months and then kiln-dried. This necessitates a large investment in stock, interest on the investment, fire insurance, and the cost of repeated handlings. In an effort to eliminate a considerable portion of this expense one of the large manufacturers is co-operating with the forest products laboratory in an effort to perfect a method of kiln-drying the blocks green from the mill. Sufficient progress has been made to indicate that a solution of this problem will be found. Hundreds of rough-turned green blocks are being dried in the laboratory experimental kilns in a very short time and with promising results.—Warren H. Bullock, in American Forestry.

Precious Minutes



International Time Recorder.

An attractive and quite a unique booklet entitled "Precious Minutes," has been published and is being widely circulated by the International Time Recording Company of Canada, Limited, whose plant and office are at 28 Anderson Street, Toronto. How the Battle of Waterloo was lost, not by Napoleon as was commonly imagined, but by General Grouchy, who did not attach sufficient importance to minutes, is the point of the story told by the bulletin. With this moral clearly pointed out the rest of the bulletin is devoted to references to the importance of saving time in business life, and, in conclusion, a natural allusion to the fact that one of the most reasonable and profitable methods of saving time is by the use of International Time Recorders.

Co-operative Plan for Giving Service

The Bridgeport Wood Finishing Company, of New Milford, Conn., U.S.A., conduct a co-operative plan with lumber dealers and planing mill men in various sections of the country, whereby the latter carry a stock of the company's finishing materials and an exhibit of finished specimens of woodwork for showing to customers. The plan is calculated to assist both parties, first by enabling the lumber dealer or millman to give good service to his customers, and thereby arouse a greater interest in lumber, and secondly by creating a larger demand for finishing materials. The plan appears to be a good one. It does not require a great deal of space in the office of the dealer or millman to house an attractive display of finished samples of wood and a well-assorted stock of finishing materials, and as the average householder or house-builder has a very limited knowledge of wood finishing, the dealer is enabled to give his customers a form of service that will be appreciated.

There is no set rule which of itself will make a man a good varnisher. Practice and experience only will bring it out if it is in him.

Never lose heart over a mistake. If the best men's faults were written on their foreheads, many would pull their hats over their eyes.

FOR SALE!

1 car 2 x 2 —19 in. Clear Oak.
1¾ x 1¾—19 in. Clear Oak.

1 car 2 x 2 —40 in. Clear Maple.

3 cars 1 x 6, 8 and 10 in. Dry Maple, Birch, Cherry, Ash and Oak, 2, 3 and 4 ft. long.

1 car 1 x 1—24 and 48 in. Clear Maple and Birch.

1 car 1 x 1—19 in. Clear K. D. Oak.

1 car 4/4 x 2½ to 5½ in. Clear, Bone Dry Qtd. White Oak Strips, mostly 4 to 5½ ins. wide.

5 cars 1 x 3 in. and up 34, 38, 40, 42 and 48 in. Clear Dry Oak.

1 car 2 x 2—26 in. Clear Dry Ash.
2½ x 2½—25 in. Clear Dry Ash.

2 cars 2 x 2—19 in. and 30 in. Clear Oak.

The above is dry and thoroughly seasoned and shipment can be made promptly

The Probst Lumber Co.
Cincinnati, Ohio

Rexford
Veneer Tapes

Combine all the qualities desired by manufacturers and users of veneers.

"Let a sample roll tell its own story"

Please state your requirements and, if possible, send sample of tape you are now using.

Rexford Gummed Tape Co.
Manufacturers
Home Office, 598 Clinton St., MILWAUKEE, Wis.
St. Louis, Mo. Branch, 416 Rialto Building. Olive 3529
Chicago, Ill., Branch, 20 E. Jackson Blvd. Harrison 6107

- AT YOUR SERVICE -

We submit for your interest the following choice
HARDWOODS:

2 cars 4/4 No. 2 Com. and Bet. Soft Elm.
1 car 6/4 No. 1 Com. and Bet. Soft Elm.
100 M 4/4 x 4 up No. 1 Com. and Better Birch.
5 M 5/4 x 4 up first and seconds Birch.
13 M 4/4 x 4 up No. 3 Com. and Btr. Birch, average 9 in. wide.
5 M 8/4 x 4 up No. 1 Com. and Btr. Birch, average 10 in. wide.
5,000 ft. 6/4 No. 1 Com. and Bet. Birch.
3 cars 6 x 12 to 12 x 12 x 16/20 Norway timbers.
33,000 ft. 10/4 No. 1 Com. and Bet. Birch.
1 car 4 in. x 6 Sound Birch Hearts.
5 cars 4/4 No. 3 Com. Beech and Maple.
7,000 ft. 16/4 First and Second Hickory.
200 ft. 12/4 No. 1 Com. and Bet. Hickory.
2,500, ft. 8/4 No. 1 Com. and Bet. Hickory.
50,000 ft. 4/4 x 3 Spruce Crating.
50,000 ft. 4/4 x 4 and up Spruce Crating.

All the above stock thoroughly dry and well manufactured

We have a full line of all grades of White Pine, Norway and Spruce LATH.

Write, wire or 'phone your inquiries and they will have careful attention

Graves, Bigwood & Co.
Manufacturers
of
PINE HEMLOCK HARDWOOD } LUMBER
712 Traders Bank Building
TORONTO - ONT.
Mills at—Byng Inlet, Ont.
and
Deer Lake, Ont.

News of the Trade

A by-law was passed recently reducing the number of directors of the Elmira Furniture Company, Limited, to three.

A site has been purchased at Winnipeg, Man., by the Richardson Grain Separator Company, who expect to establish a plant at that place.

The carriage works owned by J. A. McCallum at Sydney, N.S., were recently destroyed by fire. The loss is $14,000, of which half is covered by insurance.

Mr. J. E. Alain, of the Victoriaville Furniture Company, Limited, Victoriaville, Que., was recently elected mayor of Victoriaville by acclamation. This is Mr. Alain's second term as mayor.

A factory for the manufacture of cheese boxes will be established in Ingersoll by C. B. Janes & Company, Limited, who also have factories at Orillia and Belleville. The manager of the factory will be J. A. Cornfoot, of Ingersoll.

A company has been incorporated in British Columbia under the name of "Cedars, Limited," to manufacture lumber, sash and doors, boxes, etc. The head office of the company is to be at Vancouver and the capital is $30,000.

A recent incorporation is that of the Victoria Toy Manufacturing Company of Victoriaville, Que. The company will manufacture toy furniture, rocking horses, etc. J. E. Alain and P. Touvigny, of the Victoriaville Furniture Company, are interested.

The Berlin Table Company, Kitchener, Ont., are putting an addition to their factory. We understand that they expect to manufacture shell boxes this winter and in the spring turn the new addition over to their enlarged furniture line.

"Canadian Aeroplanes, Limited," have purchased a site in Toronto and expect to erect buildings to the value of $500,000, to carry on the business of manufacturing flying machines. F. W. Baillie, 20 Victoria Street, Toronto, is the general manager.

Mr. Peter Durst, who conducted a cooperage business at Stratford for many years, is dead. He was visiting his son, who is connected with a furniture manufacturing firm in Chesley, Ont., and got a sliver in his thumb, which resulted in blood poisoning.

Cigar boxes made of Spanish cedar have been manufactured in Vancouver for a number of years past by Talbot Ward, who has now sold the business and goodwill to Arthur J. Smaill. The factory, which is located at 330 Drake Street, is now in operation.

The management of the Durham Furniture Company, of Durham, Ont., have worked out a scheme for sharing the profits of the business with the employees. This scheme is explained in a letter received from the company, which is published elsewhere in this issue.

The recent furniture exhibition at Stratford, Ont., attracted buyers from Quebec, the Maritime Provinces and points in Western Canada. Stratford shows signs of being the Grand Rapids of Canada. A feature of the exhibition was the fine displays of period furniture.

Robert Bury & Company (Canada) Limited, Toronto, Ont., have been incorporated to take over as a going concern the business now carried on in the city of Toronto by Robert Bury & Company, lumber merchants, and to carry on a general lumber business. The capital stock of the company is $40,000.

An "at home" was given by the Hespeler Furniture Company recently, when residents of Hespeler and surrounding towns were given an opportunity to inspect the furniture manufactured by the company. The goods were displayed in the company's warerooms and a large number of citizens availed themselves of the opportunity to examine the company's products.

The men behind the Pathe Freres Phonograph Company of Canada, Limited, now located in their new factory at 4-6-8 Clifford Street, Toronto, are Mr. James Malcolm and Mr. Andrew Malcolm, of the A. Malcolm Furniture Company, Kincardine and Listowell. Mr. J. L. Perron and Mr. N. G. Valiquette. W. J. Craig is the secretary-treasurer; O. C. Dorian general manager; E. M. Kearsing, factory superintendent.

Electrically Equipped Furniture

(Continued from page 35)

Dining room tables have been electrically wired and equipped with outlets to use electric candelabra and electric percolators, chafing dishes, toasters, etc., etc., such electrically equipped table being connected with outlet in the floor below the table.

Dinner wagons, usually on wheels, have been wired and equipped with outlets for using electric chafing dishes, percolators, toasters, samovars, etc., same being connected with either a baseboard outlet, or an outlet provided in the floor under the dining room table.

The above incomplete electric applications as applied to furniture are indicated to more fully inform you as to the information which is desired. Somewhat similar electrical applications will naturally occur to you.

In the event that your company has ever manufactured furniture of this character, or if you happen to know of any development of this nature which has been created elsewhere, we would appreciate your so advising us, conveying as much detailed information as possible with respect to the type of furniture equipped, lighting fixtures employed (together with the names of lighting fixture manufacturers supplying such equipment) outlets for attachment of electrical appliances, wiring specifications, etc., supplemented, if possible, by photographs of furniture so equipped.

Any information whatsoever that you can let the writer have in this matter will be very greatly appreciated, and we will, at a later date, transmit to you some ideas which we feel will be of distinct value to you.

A. Jackson Marshall, Executive Representative.
29 West 39th Street, New York, N.Y.

The Association advise us further that they are planning to display one or more complete lines of electrically-equipped furniture at their large Electrical Exhibition to be held on the Million Dollar pier at Atlantic City, N.J., the week of May 28.

Galbraith & Co., Ltd.
Owen Sound, Ont.
Manufacturers of
"Well-Made" Wood Specialties
Toys, Games, Turned Goods and Kitchenware
We Specialize on
CUSTOMS TURNINGS
Your order will receive prompt attention

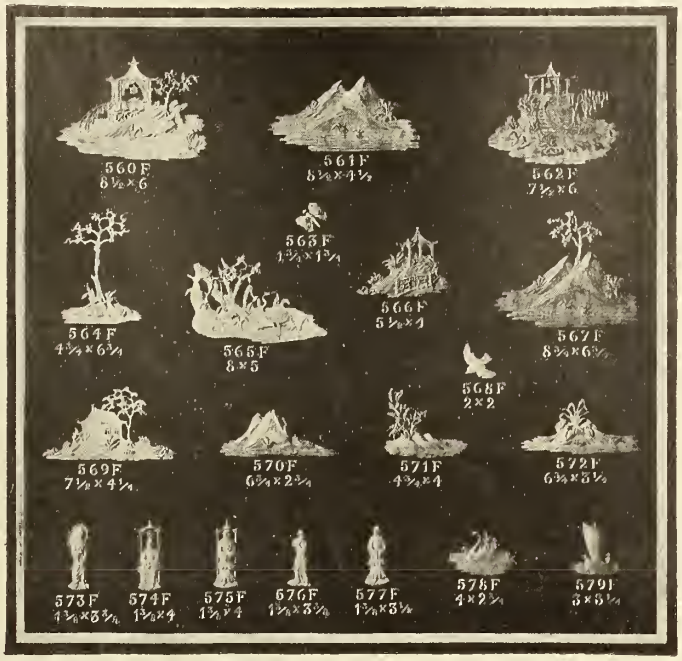
CARVINGS FOR PERIOD FURNITURE

Composition Carvings

are now extensively used for furniture decorations.

This is a material that will interest all manufacturers of furniture.

Write for Catalog and prices.



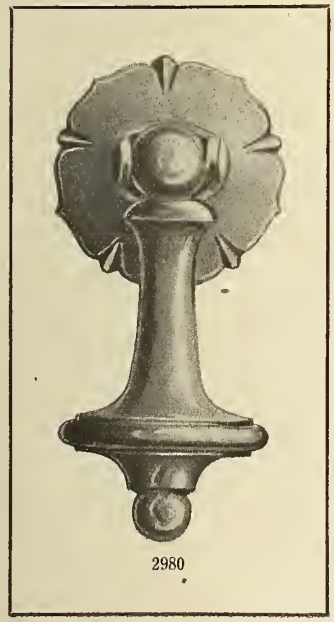
Most durable and practical Carvings on the market.

We have thousands of stock designs in all the different styles; can also manufacture according to your special designs.

Samples sent on request.

THE DECORATORS SUPPLY CO., 2551 Archer Ave., Chicago, Ill.

FURNITURE TRIMMINGS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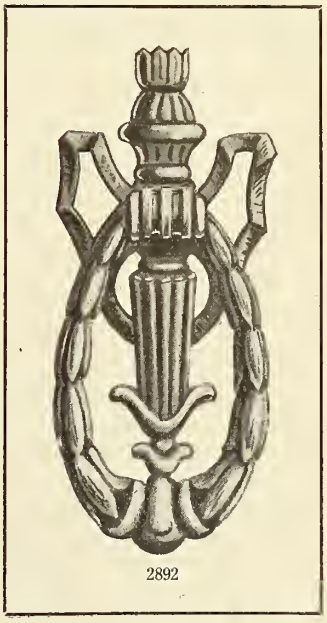
of every description, including many Period designs

New Designs in Glass Knobs

Kitchen Cabinet Trimmings
in any finish to order

CASTERS
for all kinds of furniture

Send for our samples and prices before placing orders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THE BURNS & BASSICK COMPANY
BRIDGEPORT, CONN., U. S. A.

FOR SALE

One new eight (8) inch H. B. Smith molder. A good bargain.

For particulars write to
AMHERST PIANOS, LIMITED,
Amherst, N.S.

For Sale—Panel Poplar

1 Car 5/8 in., 7 to 17 in. wide, mostly 12 in. and up
48,000 ft. 5/8 in., 17 to 23 in. wide, 50 per cent. 16 ft. long.
32,000 5/8 in., 24 in. and up wide, 50 per cent. 16 ft. long.
21,000 ft. 3/4 in., 24 in. and up wide, 50 per cent. 16 ft. long.

CHARLES F. SHIELS & CO.,
12-1-2. Cincinnati, Ohio.

SNAPS

Woodworking Machinery

for

WESTERN BUYERS

Band saws (2) 36 in. McGregor.
Boring Machines (2) Cowan Post.
Clamp, Greenlee, for Sash.
Clamp, Cowan, for Doors.
Dovetailer, American, for Sash.
Dovetailer, Fay-Egan, for Drawers.
Fan, 60-in. Double American.
Jointer, 24-in. Cowan.
Knife Grinder, 36-in. Cowan.
Lathes, Turning (four of them).
Moulders, 8 in., 10 in., and 12 in.
Matcher, Berlin No. 94.
Matcher, McGregor & Gourlay.
Mortiser, New Britain Chain No. 1.
Mortiser, New Britain Chain No. 7.
Mortiser, Cowan Chain No. 255.
Mortiser, McGregor Upright Chisel.
Mortiser, Greenlee Hollow Chisel.
Resaw, Berlin 54-in.
Resaw, Clement 54-in.
Resaw, Cowan 48-in.
Relisher, Greenlee for Sash.
Sander, 60-in. Columbia 3-Drum.
Sander, Schimmel, Belt.
Sander, 20-in. Disc.
Sash Sticker, McGregor Double P & B.
Sash Sticker, American No. 3 Double.
Sticker, Door, American No. 5 Double.
Saw, Cut-off "Lightning" and others.
Saw, Variety (several).
Saw, Rip, Hand Feed (several).
Saw, Power Feed (several).
Shaper, McGregor Double Spindle.
Tenoners (Houston Single—Hays Dbl.)
Veneer Press Sections (seven) 36-in.
Motors, Engines, Shafting, Pulleys, etc.

Write for Prices

J. L. Neilson & Co.
WINNIPEG

Second-Hand Machines For Sale

We have the following to offer. Ask us about others not listed, if you are interested.

1	Egan	30-in. 2 Drum Sander.
1	McGregor Gourlay	30-in. 2 Drum Boss Sander.
1	Jackson Cochrane	36-in. 3 Drum Sander.
1	Egan	42-in. 3 Drum Sander.
1	Cowan	42-in. 3 Drum Sander.
1	Cowan	48-in. 3 Drum Sander.
1	C. M. C.	8-in. 4 side Sticker.
2	Ballantyne	12-in. 4 side Sticker.
1	Egan	36-in. Single Surfacer.
1	Harper	26-in. Single Surfacer.
1	Cowan No. 220	24 x 10 Single Surfacer.
1	McGregor Gourlay	QY 15-in. Planer & Matcher.
1	McGregor Gourlay	QY 9-in. Planer & Matcher.
1	Jackson Cochrane	54-in. Band Resaw 5-in. blade.
1	Jackson Cochrane	No. 165 Rip Saw.

P. B. Yates Machine Co., Limited
Hamilton, Ontario t-f

Dovetailer For Sale

We have a 12 spindle Jackson Cochrane Gang Dovetailer, which has been in use less than six weeks. It is as good as new, and will be sold cheap, as we have no further use for it.

Kent McClain Limited
181 Carlaw Avenue
Toronto

Second-Hand Woodworking Machines

Duplex Moulding Sander (new).
Band Saws—26-in., 36-in., 40-in.
Jointers—12-in., 16-in.
Shapers—Single and double spindle.
Fay No. 4—42-in. Band Resaw.
Berlin No. 260—36-in. Circular Resaw.
Lathes—16 in. x 8 ft. Wood Bed Pattern Makers. Egan Variety Wood Turning.
Surfacers—American No. 112, 26 in. x 8 in. Fay & Egan No. 9, 30 in. x 6 in., Double. Atlantic Works 24 in. x 8 in. Single.
Mortisers—No. 5 and No. 7 New Britain.
Rip and Cut-off Saws; Molders; Sash Relishers, etc.
Over 100 machines, New and Used, in stock.

Baird Machinery Company,
123 Water Street,
PITTSBURGH, PA.

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of

NEW and USED

WOOD TOOLS

in stock for immediate delivery

Wood Planers

30" Whitney pattern surfacer.
26" Revolving bed single surfacer.
26" Revolving bed double surfacers.
24" Major Harper planer and matcher.
24" Single surfacers, various makes.
22" Stationary bed surface planer.

Band Saws

42" Fay & Egan power feed rip.
38" Atlantic tilting frame.
30" Ideal pedestal, tilting table.
26" Crescent pedestal (2).
20" Crescent pedestal (2).

Saw Tables

Ballantine variable power feed.
Preston variable power feed.
Cowan heavy power feed, M138.
Ideal variety, tilting table.
12' Defiance automatic equalizer.
MacGregor Gourlay railway cut-off.
6' Crescent iron frame swing.

Mortisers

Cowan hollow chisel, M190.
Galt upright, compound table.
Fay graduated stroke.
No. 2 Smart foot power.
No. 1 Smart foot power.

Moulders

13" Clark-Demill four-side.
12" Cowan four side.
10" Houston four side.
6" Cowan four side.
6" Dundas sash sticker.

Sanders

24" Fay double drum.
12" C.M.C. disk and drum.
18" Crescent disk, adjustable table.

Clothespin Machinery

Humphrey No. 8 giant slab resaw.
Humphrey gang slitter.
Humphrey cylinder cutting-off machine.
Humphrey automatic lathes (6).
Humphrey double slotters (4).

Miscellaneous

Fay & Egan 12 spindle dovetailer.
MacGregor Gourlay 12 spindle dovetailer.
Cowan dowel machine, M80.
Cowan post boring machine, M85G.
Cowan post boring machine, M23.
Galt blind slat re-saw.
Cowan sash clamp.
Egan sash and door tenoner.
No. 6 Lion universal woodtrimmer.
6 nail box nailer, Meyers patent.
48" 3 saw edger.
20" American wood scraper.
16" Ideal wood lathes (3).
4-head rounding machines.
Cowan spindle carver, M63.
Cowan veneer press screws.
Dunbar automatic shingle machine.
No. 1 Hart automatic saw filer.

Prices, Descriptions and Full Particulars on Request

H. W. PETRIE, LTD.
Front St. W., Toronto, Ont.

WANTED

Birch, 2 cars, dry 1 in. unselected Firsts and Seconds; red all in, 50 per cent. 14 and 16 ft.

CHARLES F. SHIELS & CO.,
12-1-2 Cincinnati, Ohio.

Black Walnut Again Popular for Furniture

The demand for black walnut for the manufacture of gun stocks, billiard cues and other articles requiring this scarce product has stimulated a return to the demand for walnut for furniture.

The return of black walnut as a popular furniture material will arouse an enthusiastic interest at least on the part of those who are in middle life and who can recall the dignity and beauty of this durable forest wood cut and carved into bed, bureau, table and dresser.

Just why it lost out in popularity, except for scarcity, it is difficult to understand. Possessing a natural wood color, it is susceptible to treatment that easily develops a beauty unsurpassed even by mahogany, which demands artificial coloring in bringing out its rich effect. And as for oak, natural, or artificially colored, it cannot be compared with black walnut for beauty, durability or any other qualities that make a piece of furniture which satisfies.

Fortunately for the lovers of black walnue—and they are as numerous as those who have enjoyed the beauty of it in their homes—it is said the American supply is far from exhausted; and on the other hand, unfortunately there is such a demand for it in the manufacture of small arms as must unquestionably boost the price of it. Enough black walnut is consumed in making a single gun stock to make a couple of chair legs.

Many a strong, dignified, beautiful and substantial piece of walnut furniture has been consigned to the garret within the last twenty years, and often to make way for a piece of cheap mahogany that could not compare with it. Housewives will naturally begin to realize their error, now that black walnut is coming again into vogue and there will no doubt be a ransacking of garrets to haul out and revitalize what of it has not gone to the junk dealer and the second hand furniture man.

The American Walnut Association of Louisville, Ky., has published a very interesting booklet describing the beauties and advantages of American black walnut in furniture making, for interior finish, in panels, and in fine cabinet work, as well as in other lines of manufacture. This wood is termed "the aristocrat of American hardwoods" by the association, and a great number of testimonials from manufacturers and other users of woods are introduced in support of this statement. Special emphasis is laid upon the increasing quantity of black walnut that is going into furniture, as the American wood is now being used largely in place of Circassian walnut, the importation of which was stopped by the war. A partial list of the manufacturers using black walnut is given, as well as the names of the firms that are members of the association. Emphasis is laid upon the fact that American black walnut is plentiful, government reports showing that the annual cut is about 50,000,000 feet yearly.

A Warm Room in the Factory

It is not an unusual thing, especially around planing mills using veneer, to find a warm room or compartment used for drying out veneer and core work. They are also being found more and more in connection with furniture factories, and they help in a way, but not always in the right way.

Any man with a room of this kind, or who contemplates setting up and using a warm room, either for stock previous to gluing or for setting after gluing, should remember that ventilation is essential to drying, even in warm air. The warm air will take up only a limited amount of moisture from stock piled in it, and to do the drying out as it should be done the warm air in the room must be carried off and fresh air let in. The air is a vehicle for taking up and carrying off the moisture, and if ventilation is not provided so that fresh air may be coming in all the time, the air in the warm room becomes saturated and remains there, with the result that the stock becomes warm, but not dry. So have the warm room, but ventilate it to get good results, for merely heating stock is not drying it, and proper drying calls for air to pass through the stock and out.—Hardwood Record.

WATCHMAN'S CLOCKS
Hardinge Portable
The only unlimited System.
Patrol clock, each $39.60 complete.
Stations, any number needed $4.10.
Also Key Type Clocks, limited capacity.
F.O.B. Toronto. Write for catalogues.
Signal Systems Co., 110 Church St., Toronto

Buy Something Worth While
—Don't be Influenced by Low Prices or a Coat of Paint

Andrew's 12-ft. double-column borer, 12 heads.
Andrew's 30-in. 3-spindle vertical borer, practically new.
Andrew's single spindle vertical borer, practically new.
Band rip saw, Fay & Egan, 42 in.
Band resaw, Fay & Egan, 60 in.
Band saws, 32, 36, and 38 in.
Glue cookers and retainers. Glue spreaders.
Jointers, 12, 16, 20, and 24 in.
Lathes, Mattison, Nos. 7 and 8, automatic.
Matcher, American Northwest, 24 x 8 in.
Matchers, 24 x 6 in., 3 and 4 sides.
Molders, inside, 13 in., American and Woods.
Molders, 4 side, 9, 10, and 12 in., American.
Molder, Smith latest, 9-in. No. 107-A.
Mortiser and router, Fay & Egan No. 124.
Mortiser, chain saw No. 7, New Britain Mach. Co., six chains.
Rip saw, Greenlee self-feed, heavy, No. 426.
Sanders, 42-in. Columbia, 24 and 30-in. Fay & Egan double.
Saws, combination and variety, tilting table.
Surfacers, American 4½, 36-in. sectional roll and chip-breaker; Whitney 30-in. single sectional roll; 36-in. solid roll; Fay & Egan No. 140 double, 27 and 30 in. divided roll.. Single, 16 in., 18 in., 20 in., 24 in., 26 in., 30 in.
Shapers, Smith's latest, double and single; also Shimer single, with overhead routing arm.
Tenoners, Fay & Egan double end, 8 ft. long, D. H. & D. C.; also several single end.
Timber sizer, Woods 30 x 10, divided rolls.
Veneer jointer, Veneer Machinery Co. make.
Window frame machines, Phillips and Smith & Phillips.
Wood-workers, universal, Fay & Egan 10½ in. and Bentel & Margedant No. 4, 9 in.; also extra heavy Bentel & Margedant 12-in. machine for extra heavy work.

The Osborne & Sexton Machinery Co.
Re-Manufacturers COLUMBUS, OHIO

HIGH GRADE SPRINGS

for all kinds of Upholstery Work

Constructions for Chairs, Davenports, Carriages and Automobiles.

"Fosters" Multi-Springs and Luxury Springs

Spring Filling for Top Cushions

The service resulting from 30 years' experience is at your command.

We solicit your inquiries and an opportunity to submit samples.

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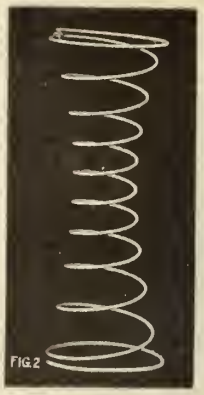
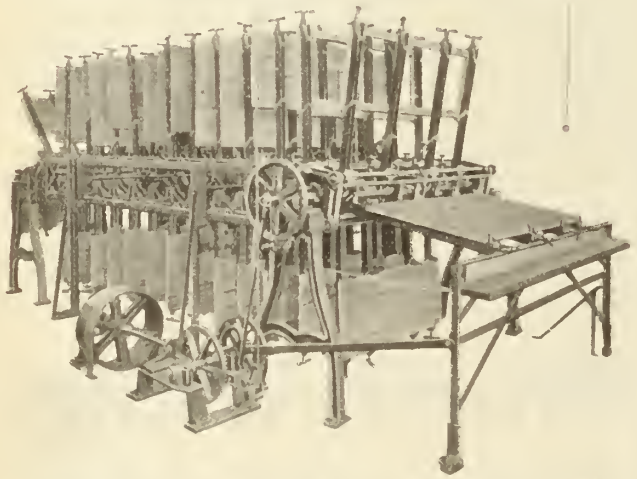


Do You Handle Glued-up Stock?

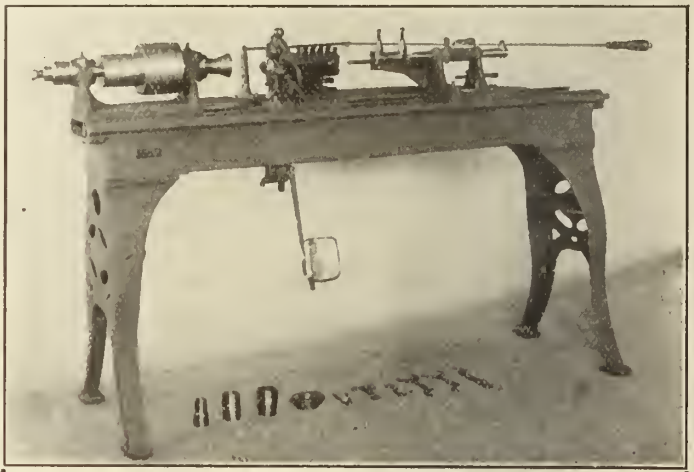


If you do, here is a machine that will save you 60 of the time and labor required to handle your work with hand clamps. This machine is the Billstrom Automatic Glue Clamp Carrier.

EXAMINE THE ILLUSTRATION

Nels J. Billstrom, 2002 Ninth Street, ROCKFORD, ILL.

R. S. Pollard, Preston, Ont.



Cut the Cost of Production

by using the

WAYMOTH VARIETY WOOD-TURNING LATHE

Every feature incorporated in the lathe which makes for a little saving in the time of the operator, every item for his convenience that enables him to do better and more rapid work, assures just that much better service to the owner.

We would like to tell you about three special features of this lathe

Our lathes are sold in Canada by

A. R. Williams Machinery Co., Toronto, Vancouver and Winnipeg.
General Supply Company of Canada, Ottawa.
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A. D. WAYMOTH & CO., FITCHBURG MASS.

Established in 1845.

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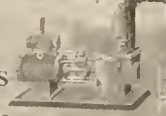

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Crating Lumber

5/8" and 1" All Grades
At Right Prices

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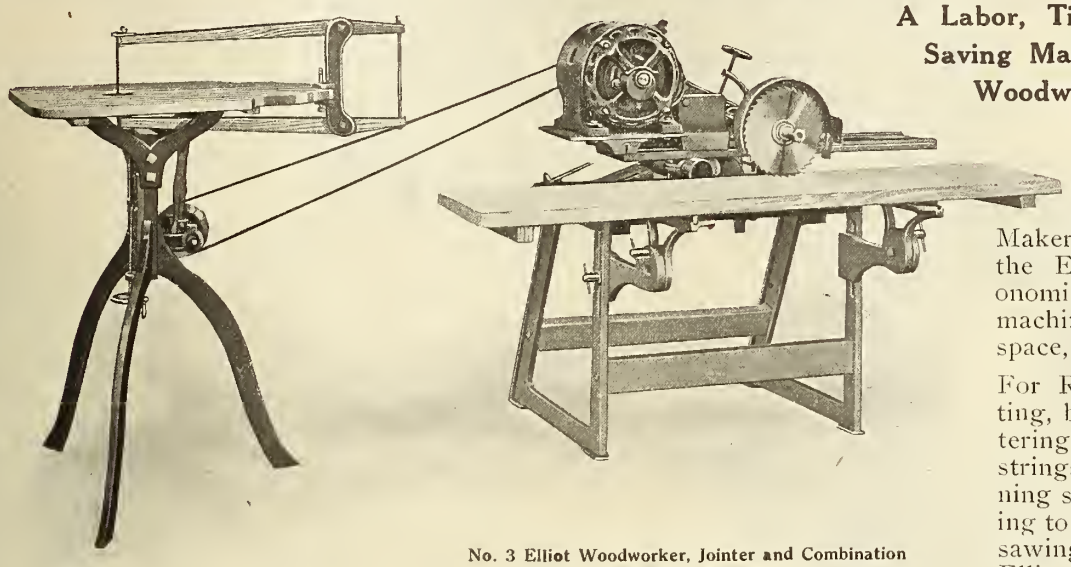
THE ELLIOT WOODWORKER



No. 3 Elliot Woodworker, Jointer and Combination Scroll Saw and Shaper.

A Labor, Time and Money-Saving Machine for Every Woodworking Shop

Furniture Manufacturers, Cabinet Makers, Pattern Makers and others find the Elliot the most economical and satisfactory machine to use. It saves space, time and material.

For Ripping, Cross Cutting, boring, dadoing, mitering, housing out stair strings, grinding, running sash or other moulding to 2 in., shaping, scroll sawing, etc., use the Elliot.

Send for illustrated circular, prices and terms.

THE ELLIOT WOODWORKER, LIMITED

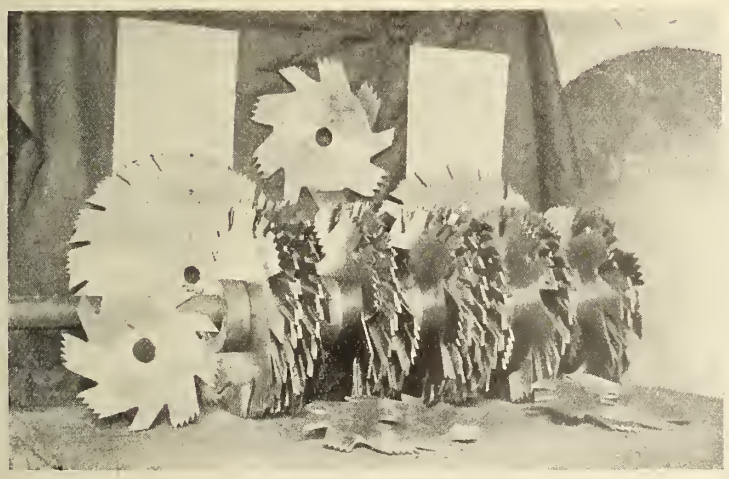
480 Bathurst Street, **Toronto, Ont.** Corner Brush and Congress Sts., **Detroit, Mich.**

Beaver **Brand**

Reduce the Cost of Making Shell Boxes

by using a

Special "Beaver" Dado



This special "Beaver" Dado was designed to meet the requirements of shell box manufacturers. This particular construction eliminates the trouble previously experienced by many manufacturers in cutting across the grain. It leaves a clean, smooth surface when cutting with or across the grain.

Illustration shows one complete order recently shipped by us to a shell box manufacturer. It consists of—five "Beaver" Dados from 1¼ in. to 2 in. wide; also two special Planer Saws for cutting of box stock; the small groover shown at centre top is to cut slot for wire handle or for string for the cover.

Get our prices on special shell box saws—we can save you money.

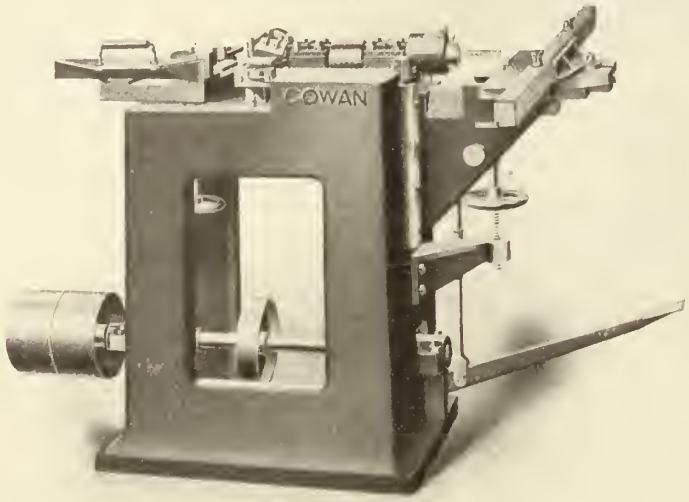
Radcliff Saw Manufacturing Company, Limited

TORONTO 550 Dundas Street, **ONTARIO**

Agents for L. & I. J. White Co., Machine Knives

Sash Relisher and Mortiser

A machine that is indispensable in the manufacture of Sash, Blinds, and all work of that class, at a profit



WE specialize in Wood Working Machinery and are in a position to equip any factory with the most modern and efficient Woodworking Machinery of all kinds.

Our past and present records are your guarantee of efficiency.

Let us know what machines you require and it will be a pleasure for us to attend to you.

COWAN & COMPANY OF GALT, LIMITED

GALT - ONTARIO

Are Your Products Perkins Glued?

Ladies' Desk manufactured by The Jacques Furniture Co., Kitchener. Ont., in which Perkins Glue was used.

The live dealer realizes the value of selling his customers Perkins Glued products because they never come apart. Many of Canada's largest furniture factories use Perkins Vegetable Glue. It costs 20 per cent. less than hide glue, is applied cold, antiquating the obnoxious and wasteful cooking process, is absolutely uniform in quality and will not blister in sanding.

We will be glad to demonstrate in your own factory and on your own stock what can be accomplished with Perkins Vegetable Glue.

Write us today for more detailed information.

Perkins Glue Co.

Hamilton, Ont. Limited

Address all inquiries to Sales Office, Perkins Glue Company, South Bend, Indiana, U. S. A.

FROST KING *"The Standard for Forty Years"* TROJAN

The Dependable Babbitt

Equally as good for heavy uty as speed. It is especially adapted for manufacturers of woodworking machinery, planing mills, furniture factories, box factories and woodworking plants.

Try it

Our High Grade Babbitt

Owing to its phenomenal ability to absorb oil "Trojan" babbitt will be found ideal for overhead bearings in line and counter-shafts as it is unnecessary to oil as often as with the ordinary babbitts.

Try it

HOYT METAL COMPANY - **Toronto, Ont.**
NEW YORK ST. LOUIS LONDON, ENG.

Morehead
Back to Boiler
SYSTEM

Read What The Wabash Cabinet Co. Say!

"With reference to the Morehead Trap, it is everything that Mr. McLachlan said it was. Before we made this change, our watchman was obliged to put in coal every fifteen minutes. Now he puts in a fire on an average of once every hour and WE ARE SAVING OVER 50 PER CENT. ON THE COST OF OUR FUEL."

You can do the same. The first step is to

Write for the "Back-to-Boiler" Book

In it you will find the condensation question discussed from several angles—and interesting pictures of installations under every possible condition.

The economic principle of the "Morehead" System will save you dollars. Write for the book TO-DAY.

Canadian Morehead Mfg Co.
Woodstock Dept. "H" Ontario

GRAND RAPIDS
VAPOR DRY KILN
GRAND RAPIDS
MICHIGAN

Increasing output of other kilns is part of our business.

We can arrange to utilize your present equipment and supplement with sufficient additional to bring your kilns to our basis of output.

We would suggest that you supply our engineering department with description of your kilns and lumber drying needs, so we can understandingly outline what can be done.

Your opening the matter will incur no obligation and we will give you, frankly, the results of our experience.

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The following books are offered at special prices subject to previous sale:

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Handrailing Simplified, by An Experienced Architect. Published by William T. Comstock, New York. 52 pages, illustrated. Price 50c.

How to Join Mouldings; or, The Arts of Mitering and Coping, by Owen B. Maginnis. Published by William T. Comstock, New York. 72 pages, illustrated. Price 50c.

Utilization of Wood-Waste (Second Revised Edition), by Ernst Hubbard. Published in 1915 by Scott, Greenwood & Sons. 192 pages, illustrated. Price $1.50.

Woodworker Publishing Company, Limited
345 Adelaide Street West, Toronto, Ontario

The "Canadian Woodworker" Buyers' Directory

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Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

END MATCHING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

EXHAUST FANS
Garlock-Walker Machinery Co., Toronto, Ont.
Sheldons Limited, Galt, Ont.

FILES
Simonds Canada Saw Co., Montreal, Que.

FLOORING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

FLUTING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.

FLUTING AND TWIST MACHINE
Preston Woodworking Machinery Company, Preston, Ont.

FURNITURE CARVINGS
Decorators Supply Co., Chicago, Ill.

FURNITURE TRIMMINGS
Burns & Bassick Co., Bridgeport, Conn.
Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.

GARNET PAPER AND CLOTH
The Carborundum Co., Niagara Falls, N.Y.
Ritchey Supply Company, Toronto, Ont.

GRAINING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Yates Machine Co., P. B., Hamilton, Ont.

GLUE
Perkins Glue Company, South Bend, Ind.

GLUE CLAMPS
Jackson, Cochrane & Company, Kitchener, Ont.
Neilson & Company, J. L., Winnipeg.

GLUE HEATERS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Kitchener, Ont.

GLUE JOINTERS
Canada Machinery Corporation, Galt, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Yates Machine Co., P. B., Hamilton, Ont

GLUE SPREADERS
Fay & Egan Co., J. A., Cincinnati, Ohio
Jackson, Cochrane & Company, Kitchener, Ont.

GLUE ROOM EQUIPMENT
Billstrom, Nels. J., Rockford, Ill.
Perrin & Company, W. R., Toronto, Ont.

GRINDERS (Cutter)
Fay & Egan Co., J. A., Cincinnati, Ohio

GRINDERS, HAND AND FOOT POWER
The Carborundum Co., Niagara Falls, N.Y.

GRINDERS (Knife)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

GRINDERS (Tool)
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Kitchener, Ont.

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"Canadian Woodworker" Buyers' Directory—Continued

GRINDING WHEELS
The Carborundum Co., Niagara Falls, N.Y.

GROOVING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.

GUM LUMBER
Anderson Tully Co., Memphis, Tenn.
Brown & Co., George C., Memphis, Tenn.
Churchill-Milton Lumber Co., Louisville, Ky.
Lamb-Fish Lumber Co., Charlestown, Miss.
Penrod, Jurden & McCowen, Memphis, Tenn.

GUMMERS, ETC.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Machinery Co. of America, Grand Rapids, Mich.

HAND PROTECTORS
Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND SCREWS
Fay & Egan Co., J. A., Cincinnati, Ohio.

HANDLE & SPOKE MACHINERY
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Whitney & Son, Baxter D., Winchendon, Mass.

HARDWARE
Burns & Bassick Co., Bridgeport, Conn.
Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.
Yokes Hardware Co., Toronto.
Weber-Knapp Co., Jamestown, N.Y.

HARDWOOD LUMBER
Aberdeen Lumber Co., Pittsburg, Pa.
Anderson-Tully Co., Memphis, Tenn.
American Hardwood Lumber Co., St. Louis, Mo.
Atlantic Lumber Company, Toronto.
Banning, Leland G., Cincinnati, Ohio.
Brown & Company, Geo. C., Memphis, Tenn.
Burns & Knapp Lumber Co., Conneautville, Pa.
Churchill-Milton Lumber Co., Louisville, Ky.
Clark & Son, Edward, Toronto, Ont.
Dermott Land & Lumber Co., Chicago, Ill.
Farrin Lumber Co., M. B., Cincinnati, Ohio.
Graves, Bigwood Company, Toronto, Ont.
Kersley, Geo., Montreal, Que.
Korn-Conkling Co., Cincinnati, Ohio.
Lamb-Fish Lumber Co., Charlestown, Miss.
Martin-Barriss Co., Cleveland, Ohio.
Mowbray & Robinson, Cincinnati, Ohio.
Paepcke Leicht Lumber Co., Chicago, Ill.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Pickrel Walnut Co., St. Louis, Mo.
Probst Lumber Co., Cincinnati, Ohio.
Read Bros., Limited, Toronto.
Shafer Lumber Co., Cyrus C., South Bend, Ind.
Spencer, C. A., Montreal, Que.

HUB MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
Perrin & Company, Wm. R., Toronto, Ont.

JOINTERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

KNIVES (Planer and others)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

LATHES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Defiance Machine Works.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.

LUMBER
Aberdeen Lumber Co., Pittsburg, Pa.
Acme Veneer & Lumber Co., Cincinnati, Ohio.
American Hardwood Lumber Co., St. Louis, Mo.
Anderson-Tully Co., Memphis, Tenn.
Banning, Leland G., Cincinnati, Ohio.
B. C. Lumber Commissioner, Toronto.
Brown & Company, Geo. C., Memphis, Tenn.
Churchill, Milton Lumber Co., Louisville, Ky.
Clark & Son, Edward, Toronto, Ont.
Dermott Land & Lumher Co., Chicago, Ill.
Dominion Mahogany & Veneer Co., Montreal,
Farrin Lumber Co., M. B., Cincinnati, Ohio.
Graves, Bigwood Company, Toronto, Ont.
Hartzell, Geo. W., Piqua, Ohio.
Huddleston, Marsh Mahogany Co., New York.
Long-Knight Lumber Co., Indianapolis.
Paepcke Leicht Lumber Company, Chicago, Ill.
Pickrel Walnut Co., St. Louis, Mo.
Probst Lumber Co., Cincinnati, Ohio.
Read Bros., Limited, Toronto.
Shafer Lumber Co., Cyrus C., South Bend, Ind.
Stimson & Co., J. V., Owensboro, Ky.

MACHINE KNIVES
Canada Machinery Corporation, Galt, Ont.
Peter Hay Knife Company, Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

MITRE MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

MITRE SAWS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Simonds Canada Saw Co., Montreal, P.Q.

MULTIPLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Reynolds Pattern & Machine Co., Moline, Ill.

PANELS
Waetjen & Co., George L., Milwaukee, Wis.

PATTERN SHOP MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PLANERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PLANING MILL MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PRESSES (Veneer)
Canada Machinery Corporation, Galt, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Perrin & Co., Wm. R., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.

PULLEYS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Machinery Co. of America, Grand Rapids, Mich.

RED GUM LUMBER
Gum Lumber Manufacturers' Association.

RESAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

RIM AND FELLOE MACHINERY
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.

RIP SAWING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SANDERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Nash, J. M., Milwaukee, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SASH, DOOR & BLIND MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SAWS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Radcliff Saw Mfg. Company, Toronto, Ont.
Shurly-Dietrich, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Smith Co., Ltd., R. H., St. Catharines, Ont.

SAW GUMMERS, ALOXITE
The Carborundum Co., Niagara Falls, N.Y.

SAW SWAGES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, Que.

SAW TABLES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SCRAPING MACHINES
Canada Machinery Corporation, Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass

SCREW DRIVING MACHINERY
Canada Machinery Corporation, Galt, Ont.
Reynolds Pattern & Machine Works, Moline, Ill

SCROLL SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

SECOND-HAND MACHINERY
Cowan & Co., Galt, Ont.
Osborne & Sexton Machinery Co., Columbus, Ohio.
Petrie, H. W.

SHAPERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Whitney & Sons, Baxter D., Winchendon, Mass
Yates Machine Co., P. B., Hamilton, Ont.

SHARPENING TOOLS
The Carborundum Co., Niagara Falls, N.Y.

SHAVING COLLECTORS
Sheldons Limited, Galt, Ont.

SHOOK BUNDLER
Neilson & Company, J. L. Winnipeg, Man.

SPRINGS FOR UPHOLSTERY
Foster Bros. Mfg. Co., Utica, N.Y.

STAINS
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.
Schmidt, Walter K., Grand Rapids, Mich.

STEAM APPLIANCES
Darling Bros., Montreal.

SINGLE SPINDLE BOXING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.

STAVE SAWING MACHINE
Whitney & Sons, Baxter D., Winchendon, Mass

STEAM TRAPS
Canadian Morehead Mfg. Co., Woodstock, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

STEEL BOX STRAPPING
Acme Steel Goods Co. of Canada, Ltd.

STEEL SHELL BOX BANDS
Acme Steel Goods Co. of Canada, Ltd.

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Peter Hay knives are made of special quality steel tempered and toughened to take and hold a keen cutting edge. Hay knives are made for all purposes.

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Made in Canada

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For Veneer and Veneer Drying

Made in Canada

William R. Perrin

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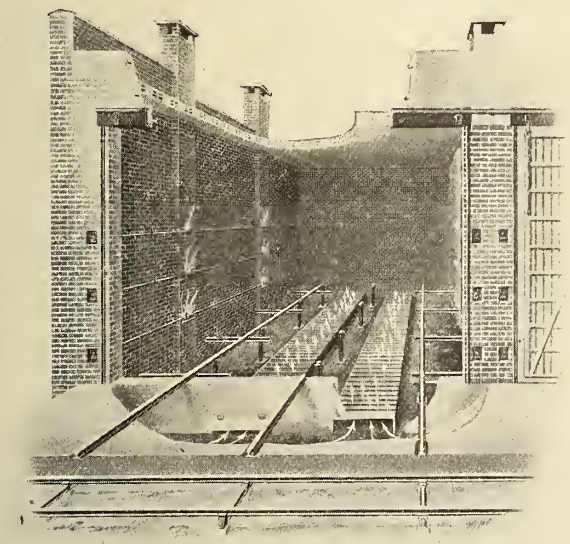

of ECONOMY is reached in the **NATIONAL DRY KILN.** Not a bit of heat is wasted and not a bit more is used than is required to do the work. The steam consumption is unusually low—the drying capacity unusually high. Let us tell you more about it.

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Messrs. Walker's Limited, 259-261 Stanley St., Winnipeg, Man.
Messrs Gorman, Clancey & Grindley Ltd., Calgary and Edmonton, Alta.
Messrs. Robt. Hamilton & Co., Ltd., Bk. of Ottawa Bldg, Vancouver, B.C.

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In bulk in Barrels and Boxes.

In coils for Automatic Driving Machines.

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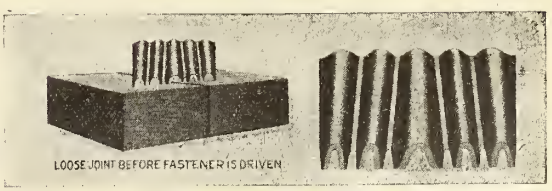


DIVERGENT SAW EDGE

"Canadian Woodworker" Buyers' Directory—Continued

SURFACERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

SWING SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

TABLE LEG LATHES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

TABLE SLIDES
Walter & Co., B., Wabash, Ind.

TENONING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

RECORDERS (TIME)
Signal Systems Company, Toronto, Ont.

TRANSMISSION MACHINERY
Dodge Mfg. Co., Ltd., Toronto, Ont.

TELEPHONES—PRIVATE SYSTEMS
Signal Systems Company, Toronto, Ont.

TRIMMERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

TRUCKS
Sheldons Limited, Galt, Ont.
National Dry Kiln Co., Indianapolis, Ind.

TURNING MACHINES
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

UNDER-CUT SELF-FEEDING FACE PLANER
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

VARNISHES
Ault & Wiborg Company, Toronto, Ont.

VARNISH SPRAYERS
DeVilbiss Mfg. Co., Toledo, Ohio.

VENEERS
Acme Veneer & Lumber Co., Cincinnati, Ohio.
Barnaby, Chas. A., Greencastle, Ind.
Central Veneer Co., Huntington, W. Virginia.
Clark Veneer Co., Walter, Grand Rapids, Mich.
Dominion Mahogany & Veneer Company, Montreal, Que.
Gorham Bros. Co., Mt. Pleasant, Mich.
Hartzell, Geo. W., Piqua, Ohio.
Haughton Veneer Company, Chicago, Ill.
Hay & Company, Woodstock, Ont.
Hoffman Bros. Company, Fort Wayne, Ind.
Geo. Kersley, Montreal, Que.
Nartzik, J. J., Chicago, Ill.
Ohio Veneer Company, Cincinnati, Ohio.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Roberts Veneer Co., New Albany, Ind.
Toronto Veneer Company, Toronto, Ont.
Waetjen & Co., George L., Milwaukee, Wis.

VENEER TAPE
Ideal Coated Paper Co., Brookfield, Mass.
Rexford Gummed Tape Co., Milwaukee, Wis.

VENTILATING APPARATUS
Sheldons Limited, Galt, Ont.

VENEERED PANELS
Hay & Company, Woodstock, Ont.

VENEER PRESSES (Hand and Power)
Canada Machinery Corporation, Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Perrin & Company, Wm. R., Toronto, Ont.

VISES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Company, Montreal, Que.

WAGON AND CARRIAGE MACHINERY
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

WATCHMAN'S CLOCKS
Signal Systems Company, Toronto, Ont.

WOOD FINISHES
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

WOOD PULLEYS
Dodge Mfg. Co., Ltd., Toronto, Ont.

WOOD TURNING MACHINERY
Canada Machinery Corporation, Galt, Ont.
Defiance Machine Works, Defiance, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Waymoth & Co., A. D., Fitchburg, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

WORK BENCHES
Fay & Egan Co., J. A., Cincinnati, Ohio.

WOODWORKING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Elliot Woodworker Limited, Toronto, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Reynolds Pattern & Machine Works, Moline, Ill.

WHEELS, Grinding, Carborundum and Aloxite
The Carborundum Co., Niagara Falls, N.Y.

You Have Paid for an Installation of

Chapman Double Ball Bearings

in Your Factory over and over again, BUT—

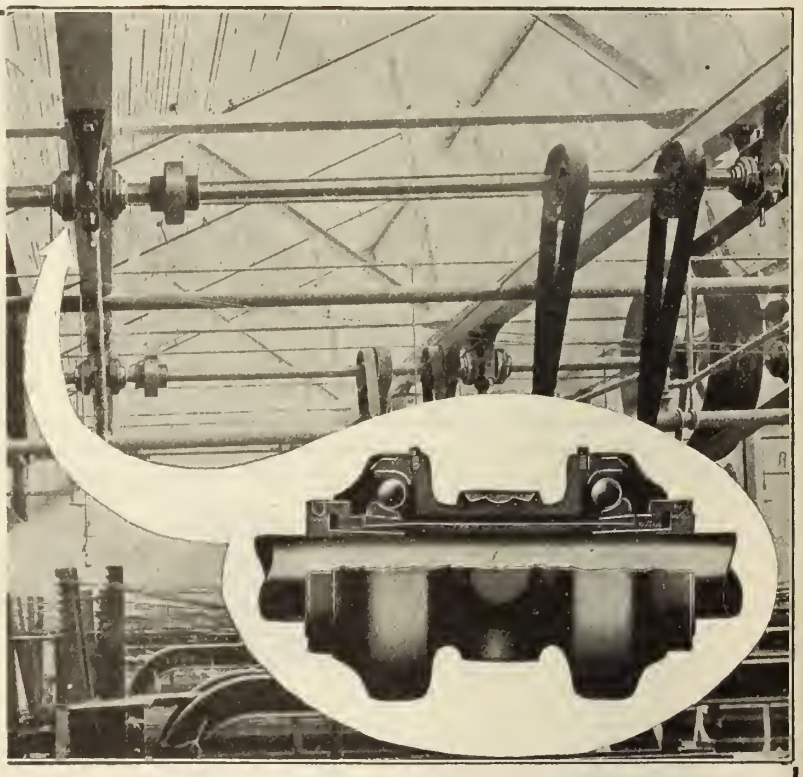
HAVE YOU GOT THEM ?

Ordinary line shafting wastes from 15 per cent. to 60 per cent. of power.

Line shafting equipped with Chapman Double Ball Bearings will eliminate about 75 per cent. of the friction, thus averaging a total saving of rom 15 per cent. to 30 per cent.

Chapman Double Ball Bearings fit any adjustable hanger and require oiling and attention only once a year. No extra equipment required to install.

Write to-day for full particulars.



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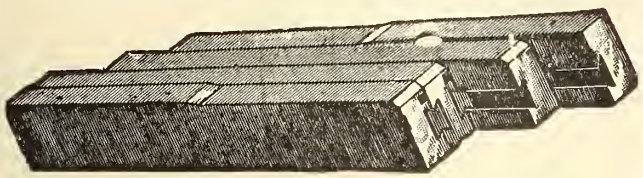
Making TABLE-SLIDES is a Specialty Business

For more than TWENTY-FIVE YEARS we have made TABLE SLIDES exclusively. Our Factory is equipped with Special Machinery which enables us to make SLIDES,—BETTER and CHEAPER than the furniture manufacturer.



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Because { They ELIMINATE SLIDE TROUBLES / Are CHEAPER and BETTER

Reduced Costs / **Increased Out-put** { BY USING **WABASH SLIDES**

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The Largest EXCLUSIVE TABLE-SLIDE Manufacturers in America

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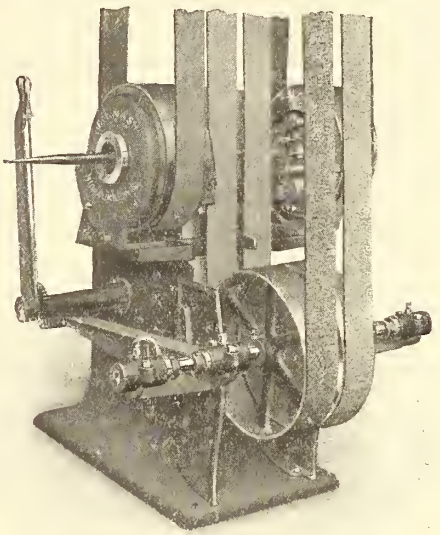
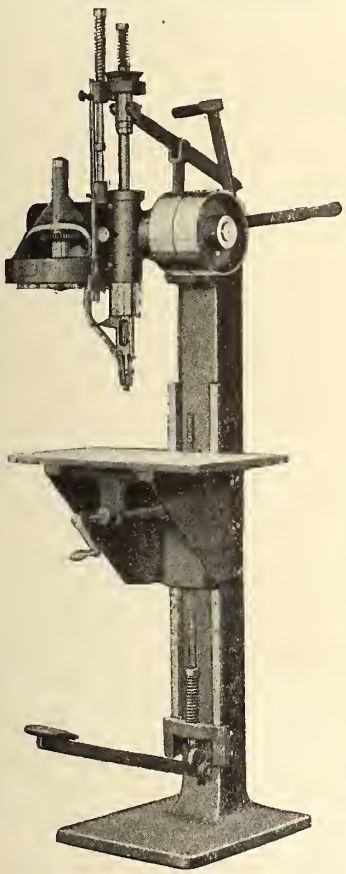
IF YOU HAVE ROUND WORK TO SAND



the **Nash Sander** will help mightily in the solving of your labor problem. It can do the work of five men.

Let me tell you how

J. M. NASH, MILWAUKEE, Wis.



No. 2 Standard Type Automatic Screw-driving Machine.

The Only Way to Drive Screws

There is a stage-coach method and a modern method of doing everything. When it comes to driving screws the only modern way is with an Automatic Screw Driving Machine, which means greater and better production and greater profit.

The Reynolds Automatic Screw-Driving Machine

is guaranteed to produce results. It is no experiment. The No. 2 Standard Type, shown herewith, is particularly suited for placing the screws in the straps of shrapnel boxes. It may be fitted to drive, without change or adjustment, any three consecutive sizes flat or round head, or two sizes filister head, No. 6 to 14 inclusive, wood or machine screws, or three sizes flat or round head, or two sizes filister head machine screws up to No. 20. All the above up to 1½ inches long if smaller than No. 10, or up to 1¾ inches long, No. 10 or larger. Fitted with boring attachment if desired.

Many Machines in Use in Canada.

Ask for our Catalogue.

REYNOLDS PATTERN & MACHINE CO.

101 and 103 Third Ave., Moline, Ill., U.S.A.

BUILT FOR ENDURANCE IN SERVICE

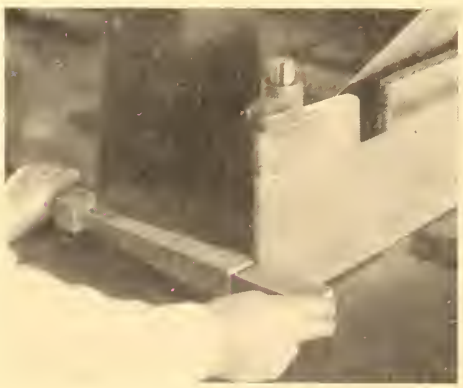
It Backs Our Words With Deeds

The Mattison Oscillating Belt Sander for edge and shaped work is so accurately and rigidly constructed that vibration is practically eliminated, which assures a positive and uniform sanding contact.

The sanding of square and octagon ornamental turnings, as well as other shaped work, is made easy on this "172," because of its ability to use small stationary forms. The oscillation of the belt prevents scratch marks and does away entirely with hand sanding. This means a big saving in labor.

No woodworking plant having edge work to sand can afford to "get along" with makeshift edge-sanders or discs, because this machine will increase capacity 50 per cent. or more, and do better work.

Stationary Forms Employed Successfully— A Big Advantage



C. MATTISON MACHINE WORKS

883 Fifth Street :-: :-: BELOIT, WISCONSIN

Volume Seventeen TORONTO, MARCH, 1917 Number Three

CANADIAN WOODWORKER and Furniture Manufacturer

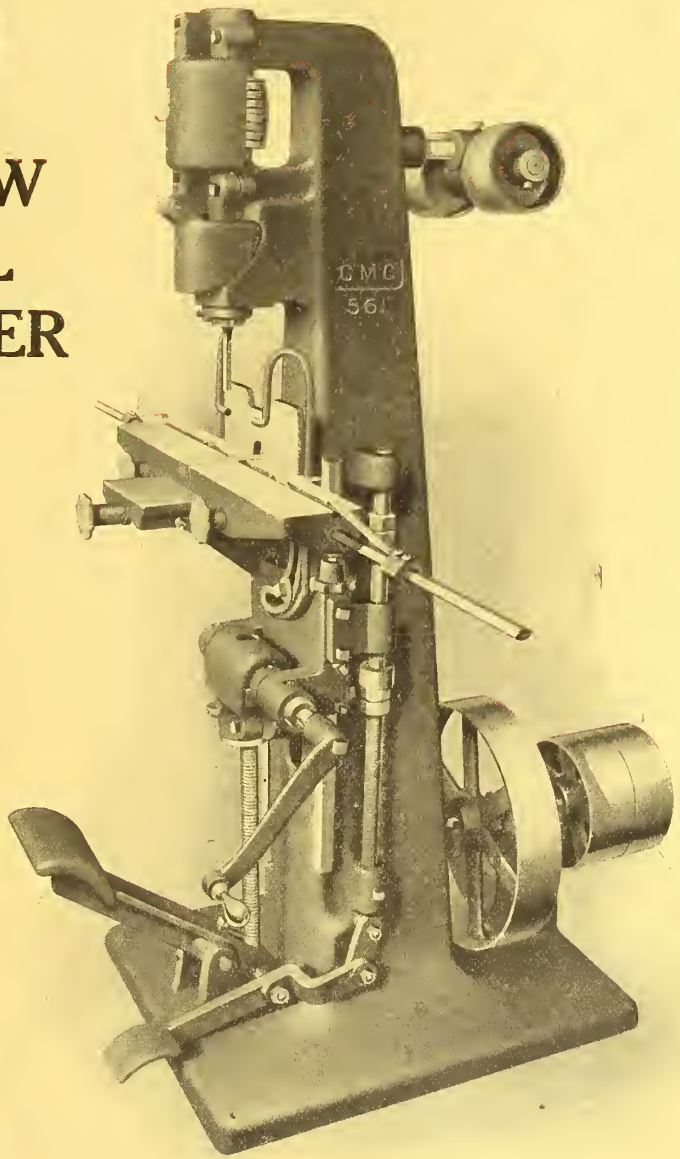
C.M.C.

No. 561
HOLLOW CHISEL MORTISER

Especially designed for rapid light mortising in sash, door, blinds, etc.

This machine embodies many new and useful improvements for increasing output, lowering operating costs, etc.

Full details shown in our Bulletin No. 561. Sent on request.



C.M.C.

INDIVIDUAL MOTOR DRIVE

can be supplied for

ALL OUR TOOLS

If interested let us submit full details.

Our designs are the result of long experience with this form of drive.

CANADA MACHINERY CORPORATION
LIMITED

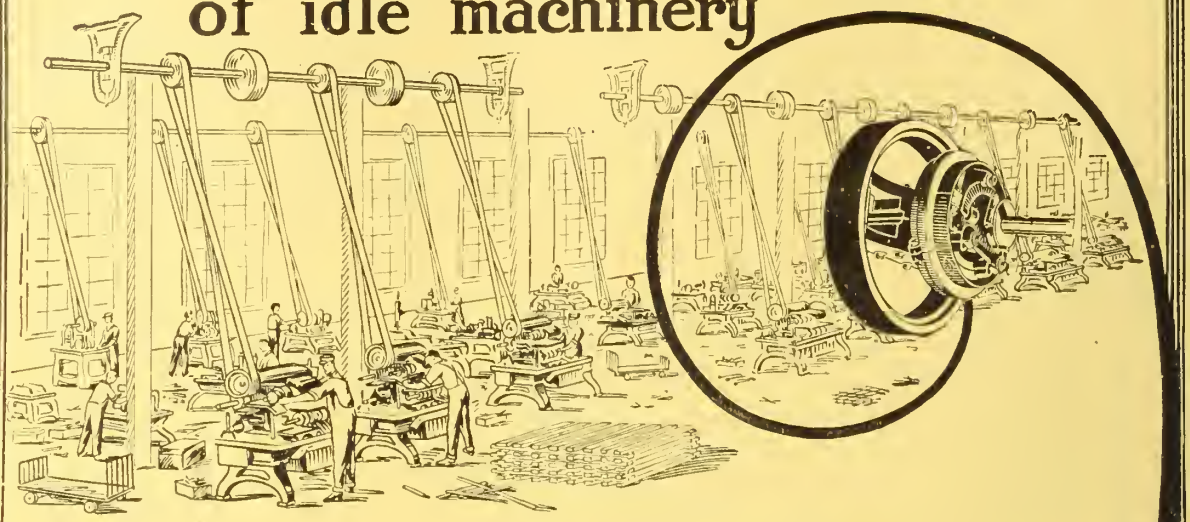
GALT - ONT.

Toronto Office and Showrooms - - - Brock Avenue Subway

Electricity in Woodworking Plants

Cut-off

the waste power of idle machinery

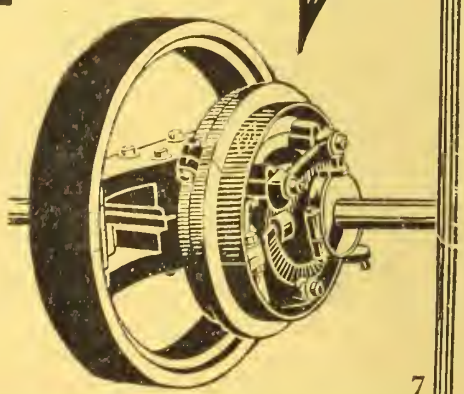


With *Dodge Friction Clutch* you can shut down parts of your Factory not operating

A GOOD friction clutch mechanism when used either as a clutch pully or a cut-off coupling is a mighty good thing in many places around a mill or factory—but when you can add to this the "split" feature you've got something real to talk about—most good mechanics know this, the trick is to get "the Boss" to know it. The timely throwing out of a Clutch Lever often prevents serious accident.

DODGE

SPLIT FRICTION CLUTCH



Sole Makers

DODGE MANUFACTURING CO., LIMITED
TORONTO, ONTARIO

7

GARLOCK-WALKER MACHINERY CO. LIMITED

32 FRONT ST. WEST, **TORONTO** TELEPHONE MAIN 5346

Experience - Confidence Service

These are three of the attributes expected by you from the concerns with whom you deal.

Our long experience covers practically every branch of the woodworking industry.

Among our "satisfied customers" we may mention the following:

Toronto Furniture Co., Toronto, Ont.
T. H. Hancock, Toronto, Ont.
Seaman, Kent Co., Meaford, Ont.
Seaman, Kent Co., Fort William, Ont.
Office Specialty Co., Newmarket, Ont.
Canadian Kodak Co., Toronto, Ont.
R. McFarlane Co., Montreal, Que.
Henry Morgan Co., Montreal, Que.
W. C. Edwards Lumber Co., Ottawa, Ont.
Brantford Piano Case Co., Brantford, Ont.
Lord & Burnham, St. Catharines, Ont.
National Steel Car Co., Hamilton, Ont.

We know we have merited their confidence, and believe we can win yours, not only from the standpoint of service but of integrity as well.

This, backed up by the lines we handle—the best of their kind—including:

American Woodworking Machinery Co.
Rochester, N.Y.

M. L. Andrews Co.
Cincinnati, Ohio

Falls Machine Co.
Sheboygan Falls, Wis.

and many others, prompts us to ask for your inquiries.

Write us for Literature and Prices

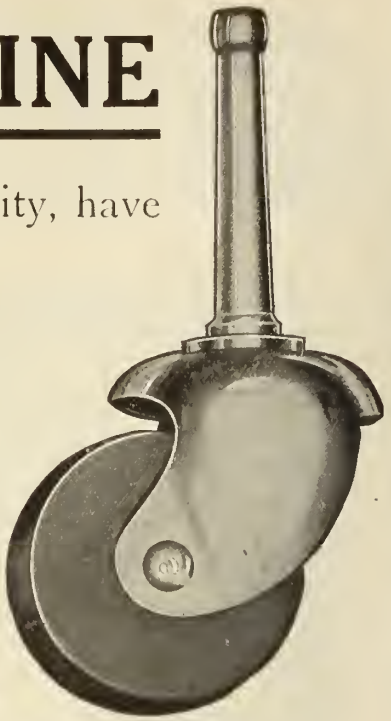
METAL and WOODWORKING MACHINERY of all Kinds

THE COMPLETE LINE

ACME CASTERS, because of their reliability, have always been the leading casters.

PERIOD TRIMMINGS in this line, because of their distinction, are in increased demand for furniture of various styles.

Our Canadian representative is at your service and will be pleased to assist you in your hardware problems.



ACME
the Reliable Caster

FOSTER MERRIAM & CO. MERIDEN, CONN.

Canadian representative—F. A. SCHMIDT, Kitchener, Ont.

You Should Use

Faultless Pivot Bearing Casters

Full Size C-3-5

Because:

The wheels used in these casters, regardless of size or kind, will last a surprisingly greater length of time than will the same kind of wheels, in non-pivot bearing casters.

SPECIAL NOTICE

FAULTLESS CASTERS received the Gold Medal, Highest Award, at the Pan-Pacific International Exposition, 1915, on "Furniture Casters of all Types."

Faultless Caster Co.

Evansville, Indiana, U.S.A.

"Move the FAULTLESS way."

A Surfacer That Cuts The Cost of Finishing

That's just what the manufacturer needs. Hand labor does most of the finishing—and hand labor is all but impossible to get. More than ever before must finishing operations be done by machines. One of the most useful and economical is

The Yates No. 156

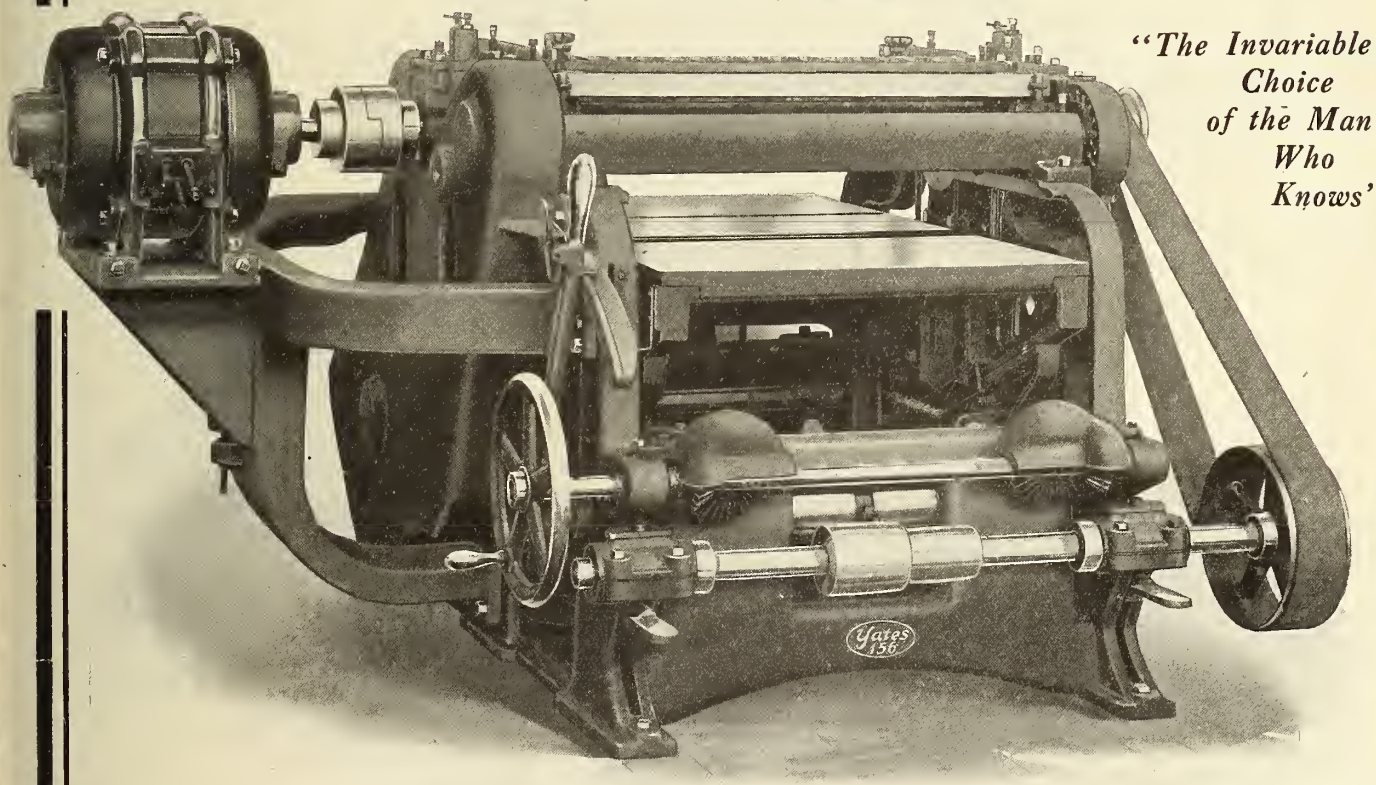
It is especially constructed for the production of fine surfacing. The heavy base absorbs vibration—powerful feed rolls present stock to the knives flat. A heavy, round cutter head, equipped with thin steel knives, runs in the improved White bearings. Jointing and grinding devices on the machine assure a perfect cutting circle. This machine frequently raises grades 40 per cent. Built for either belt, or direct motor drive, as shown. Hopper-feed can also be furnished.

Send for our circular 156. It's free and describes this economical surfacer in detail

P. B. Yates Machine Co. Ltd.

HAMILTON, ONT. CANADA

U. S. Plant – Beloit, Wisconsin



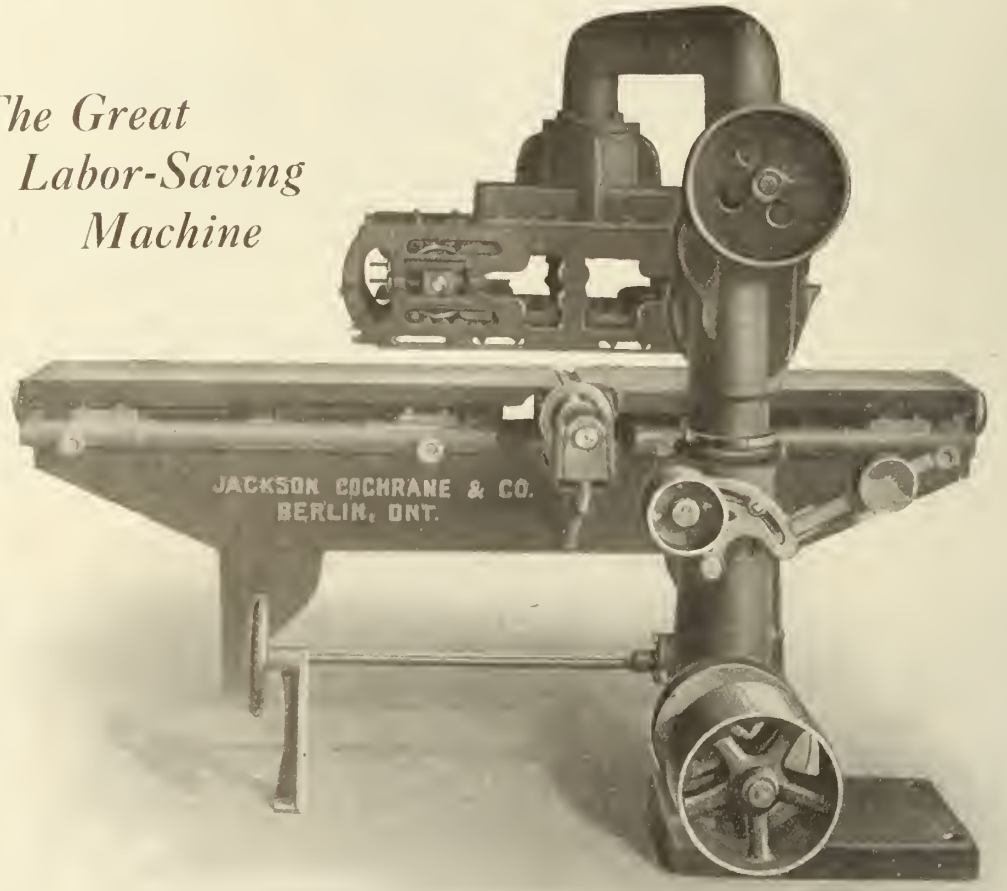
"The Invariable Choice of the Man Who Knows"

Increase Your Capacity Four Times

by installing the

Herzog Swing-Out Jointer Attachment

The Great Labor-Saving Machine

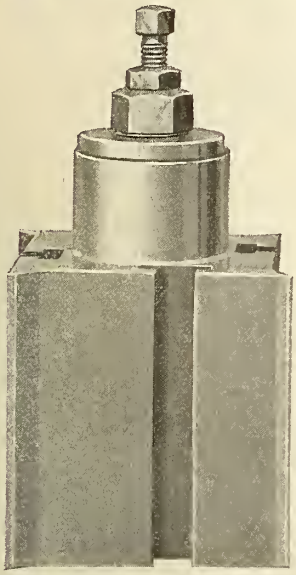


Our No. 38 Self-Feed Jointer Attachment, illustrated above, is especially desirable for factories that have but one or two jointers where it is desired to use it for squaring or edging, as the attachment can be quickly swung from the jointer. It does more and better work than four men can do with hand-jointing, can be operated by two boys, will handle stock from one inch wide to the full width of the jointer and produce perfect work. Stock can vary one-half inch in thickness without making any adjustment.

Ask for Bulletin

Jackson, Cochrane & Co., Kitchener, Ont.

Shimer Cutter Heads



Special attention at this time of the year is given by Lumber and Mill-men to the buying of Knives and Cutter Heads. Shimer Heads and Cutters are made of the best steel we can buy, and combined with careful manufacturing are the best Tools on the market.

Ask for prices on Square Heads, Matcher Heads and Sash and Door Heads.

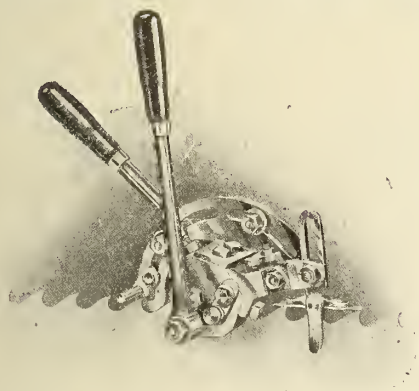
SHIMER CUTTER HEAD CO. OF CANADA, LIMITED

GALT, ONTARIO

Successors to Samuel J. Shimer & Sons, Inc.

The Ever Reliable

HANCHETT SWAGES



For

Band, Gang and Circular Saws

STANDARD THE WORLD OVER

Built in Sizes and Styles to Meet Every Requirement.

18,000 in use, or several times as many as any other make.

Write for Special Catalogue on Swages "F-2"

SOLE DISTRIBUTOR

MACHINERY COMPANY OF AMERICA

Everything for the Care of Saws — Grand Rapids, Michigan — *Everything for the Care of Knives*

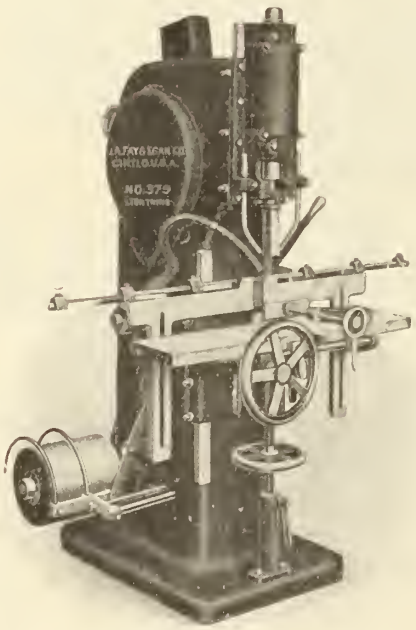
DISTRIBUTORS FOR

BALDWIN, TUTHILL & BOLTON, COVEL MANUFACTURING COMPANY, HANCHETT SWAGE WORKS

No. 25 American Blue Book—Saw and Knife Fitting Machinery—now ready.

Write us your requirements. *Your correspondence invited.*

Side View



Front View—Plain Table.

—A New Automatic Hollow Chisel Mortiser

FAY-EGAN LIGHTNING **No. 379**

—carries chisels up to 1 ½" square.

—stroke adjustable from 0 to 5".

—four speeds to chisel ram.

—micrometer set for chisels and augers so you won't break chisels.

—self-contained blower for removing chips.

—all mechanism enclosed.

—bronze bearings.

—plain, compound, or universal table.

—everything you hoped some day to find in your ideal of a mortiser.

Write for Bulletin J-26.

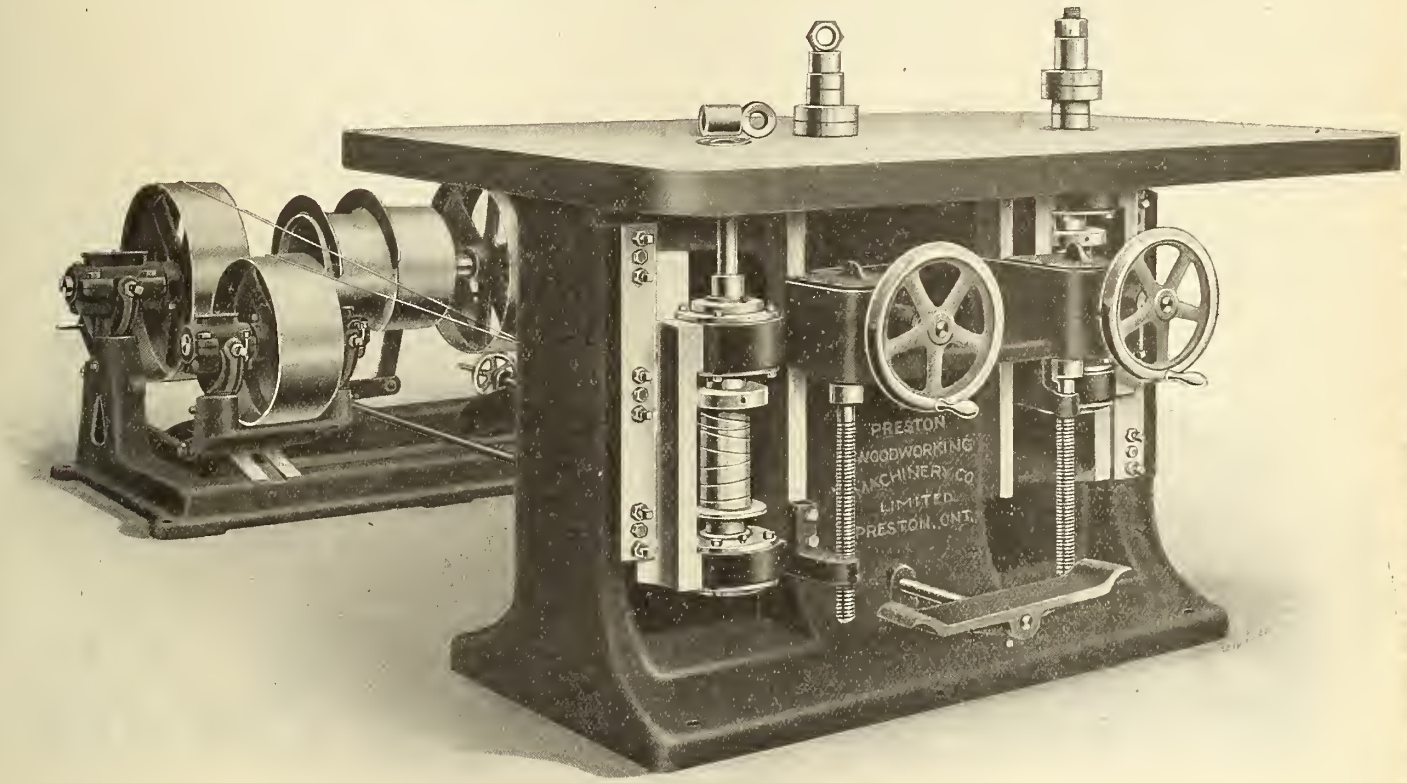
J. A. FAY & EGAN CO.

153-173 W. Front Street CINCINNATI, OHIO

"Treat your machine as a living friend."

Don't Waste Time

for which you are paying big money by having a Machine in your plant which is not giving you a maximum of production every day



No. 162 High-Speed Ball-Bearing Shaper

SEE THIS MACHINE!

It's built absolutely on honor, and will turn out 100% MORE WORK than the ordinary shaper which you are now using. That's our claim; twice the amount of work and much easier on the operator. Is it worth your while to cut your shaper cost in two? If so, drop us a line for more particulars.

THE CHEVROLET MOTOR CO. ARE USING 6 OF THESE MACHINES IN THEIR PLANT AT OSHAWA

DIMENSIONS, WEIGHTS and SPEEDS

Floor Space, 120 in. x 58 in. Net Weight, 2650 lbs. Shipping Weight, 2750 lbs. Tight and Loose Pulleys on Countershaft, 10 in. x 6 in. Driving Pulleys on Countershaft, 18 in. x 5 in. Idler Pulleys, 14 in. x 5 in. R.P.M. Countershaft, 1200. Pulley on Spindle, 3⅛ in. x 6 in. R.P.M. Spindle, 7000. Diameter Spindle, 2 3/16 in. Spindle Centres, 28 in. Table, 58 in. x 41 in. Diameter Spindle Top, 1¼ in. Horse Power Required, 3. Front Projection, 17 in. Height, 35 in.

"The Machine you want in your plant is not the cheapest machine to buy but the machine that will save you the most money to use."

The Preston Woodworking Machinery Co. Limited, Preston, Ont.

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Edward Clark & Sons

Toronto

CANADIAN HARDWOODS—winter cut **Birch, Basswood, Maple**

Ontario and Quebec Stocks, East or West, rail or water shipment direct from mill to factory.

Let us quote you on bored diaphragms for Bethlehem boxes and Linderman jointed hardwood ends and handle cleats for six inch boxes.

We Commend to Your Notice:

Our lumber is reliable, our grades uniform, our shipments prompt, and receive personal supervision; our prices consistent. We have had long experience. We desire to serve.

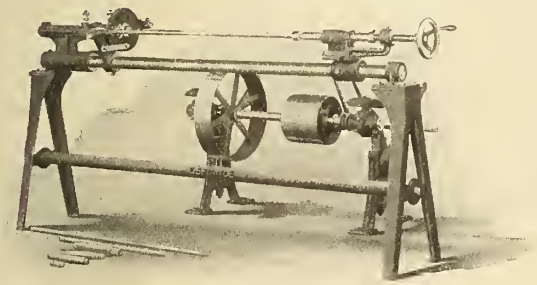
Makes Variety Turning Pay

you consistently more profit than you can look for in other machines or methods adapted to turning rounds, squares, ovals, hexagon and octagons in straight and tapered work.

Gives a large output with remarkably smooth work in turning table legs, balusters, baseball bats, croquet mallets, Indian clubs, dumb-bells, ten-pins, etc., etc.

32" Variety Turning Lathe

Turns 10,000 to 15,000 Shrapnel Plugs Daily



No 0 Hand Feed Thread Cutting Machine

Send us you samples and let us convince you how smoothly the work can be done, and at the same time tell you of the big daily output.

Address samples and letters to

The Defiance Machine Works

New York, U.S.A. Defiance, Ohio, U.S.A. London, Eng.

BLACK WALNUT

12,000 ft. 4/4 Selects 6" and up
23,000 ft. 4/4 Table Top Com.
19,000 ft. 4/4 No. 1 Common
35,000 ft. 4/4 No. 2 Com. Black
10,000 ft. 4/4 No. 2 Com. Sap.
13,000 ft. 5/4 Selects 6" and up
140,000 ft. 5/4 No. 1 Common
14,000 ft. 6/4 Selects
160,000 ft. 6/4 No. 1 Common
2,500 ft. 8/4 1 and 2
5,200 ft. 8/4 No. 1 Common
10,000 ft. 8/4 No. 2 Common

Also

Kentucky River Oak

Canadian Representative:
A. E. KLIPPERT
11 Laxton Ave., TORONTO
Phone Parkdale 1354

Wire (at my expense) or write for prices for anything in above list

Leland G. Banning, CINCINNATI OHIO

Saint Francis Basin Band Sawed Oak

Soft Textured, Evenly Colored, Red and White

Place your orders now, so when embargoes are temporarily lifted we can get some stock in transit and put our Traffic Department to work for you.

We are Headquarters for

St. Francis Basin Kraetzer Cured Gum

Send us a list of your requirements. — Delivered Prices will be cheerfully quoted.

GEO. C. BROWN & CO.

Mill—PROCTOR, Ark. **Main Office—MEMPHIS, Tenn.**

We specialize in Tennessee Aromatic Red Cedar

It is much to the credit of the better class of furniture manufacturers that they are now lavishing their worthiest designing on

RED GUM

("AMERICA'S FINEST CABINET WOOD")

RED GUM Furniture Makers have MADE A BIG HIT WITH THE WISER DEALERS, *just as furniture dealers have pleased their most discriminating customers* in putting on the market a wide range of beautifully designed and conscientiously manufactured pieces of RED GUM furniture. RED GUM is no longer identified only as a low price product. Its growing favor with the very best and most critical trade completely justifies the foresight of the industry. RED GUM FURNITURE *is now* THE FASHION. *Are YOU taking full advantage of this fact?*

Neither are up-to-date furniture *manufacturers* overlooking for a minute the wonderful value and applicability of SAP GUM to a hundred and one of their manufacturing requirements. When *properly* manufactured (as it is by the members of the undersigned Association) SAP GUM is *thoroughly reliable*, just as RED GUM is.

Let us send you the RED GUM literature and let us direct you to a group of buildings trimmed with RED GUM in your neighborhood

Gum Lumber Manufacturers Association

1314 Bank of Commerce Bldg. **Memphis, Tennessee**

Dry Spruce and Birch

Good Stocks, Prompt Shipments, Satisfaction

C. A. SPENCER, Limited

Wholesale Dealers in Rough and Dressed Lumber

Offices—500 McGill Building
MONTREAL - - Quebec

Churchill Milton Lumber Co.

Louisville, Ky.

We carry at
NEW ALBANY, IND.

Genuine Indiana Plain and Quartered Oak, Poplar

At GLENDORA, MISS.

Cypress, Gum, Cottonwood, Oak

SEND US YOUR INQUIRIES

We have dry stock on hand and can make quick shipment

American Hardwood Lumber Co.

St. Louis, Mo.

Large stock of—

Dry Ash, Quartered Oak Plain Oak and Gum

Shipments from — NASHVILLE, Tenn., NEW ORLEANS, La., and BENTON, Ark.

THE

M. B. FARRIN LUMBER COMPANY

CINCINNATI - OHIO

Manufacturers

HARDWOODS

We have very large stocks of well assorted West Virginia Hardwoods on hand at Cincinnati and also at mills.

Plain Oak	Whitewood
Quartered Oak	Red Gum
Chestnut	Ash

KILN DRIED STOCK
A SPECIALTY

BLACK WALNUT

Large Stock 1 to 3 inches thick ready for immediate shipment

also

Well Assorted Stocks of

West Virginia & Kentucky

OAK

Ash, Maple, Hickory, Chestnut, Basswood and Poplar

Prices and stock list on request

Burns & Knapp

Lumber Company

CONNEAUTVILLE, PA.

Dermott Offers You, Mr. Buyer:

QUARTERED WHITE OAK

3 cars 1 in. firsts and seconds.
1 car 1¼ in. firsts and seconds.
2 cars 1½ in. firsts and seconds.
1 car 2 in. firsts and seconds.
5 cars 1 in. No. 1 common.
2 cars 1¼ in. No. 1 common
1 car 1½ in. No. 1 common.
1 car 2 in. No. 1 common.

PLAIN WHITE OAK

10 cars 1 in. firsts and seconds.
4 cars 1¼ in. firsts and seconds.
2 cars 1½ in. firsts and seconds.
2 cars 1¾ in. firsts and seconds.
5 cars 2 in. firsts and seconds.
½ car 2½ in. firsts and seconds.
½ car 3 in. firsts and seconds.
5 cars 1 in. No. 1 common.
2 cars 1¼ in. No. 1 common.
1 car 1½ in. No. 1 common.
3 cars 2 in. No. 1 common.

PLAIN RED OAK

4 cars 1 in. firsts and seconds.
1 car 1¼ in. firsts and seconds.
1 car 1½ in. firsts and seconds.
5 cars 1 in. No. 1 common.
1 car 1¼ in. No. 1 common.
1 car 1½ in. No. 1 common.

PLAIN RED GUM

5 cars 1 in. firsts and seconds.
2 cars 1¼ in. firsts and seconds.
1 car 1½ in. firsts and seconds.
5 cars 1 in. No. 1 common.
2 cars 1¼ in. No. 1 common.
2 cars 1½ in. No. 1 common.

SAP GUM

7 cars 1 in. firsts and seconds.
2 cars 1¼ in. firsts and seconds.
2 cars 1½ in. firsts and seconds.
1 car 2 in. firsts and seconds.
5 cars 1 in. No. 1 common.
1 car 1¼ No. 1 common.
1 car 1½ in. No. 1 common.
1 car 2 in. No. 1 common.

Will be pleased to name you prices on any items in Southern Hardwoods. If you require well-manufactured stock, containing good widths and lengths, we can serve you.

DERMOTT LAND & LUMBER COMPANY

General Offices 1559 Railway Exchange Bldg. CHICAGO, ILL.

Band Mill and Yards—DERMOTT, Ark.

Long-Knight Lumber Co.

Manufacturers and Wholesale Dealers

INDIANAPOLIS, IND., U. S. A.

HARDWOOD LUMBER

Walnut, Mahogany and American Walnut Veneers

SPECIAL :

5 cars 5/4 1 & 2 Pl. Red Oak

FOR SALE

Black Walnut

Dimension Stock

5,000 feet 1 in. x 4 in. and up wide, 66 in. long.
5,000 feet 1 in. x 4 in. and up wide, 60 in. long.
10,000 feet 1 in. x 4 in. and up wide, 54 in. long.
20,000 feet 1 in. x 4 in. and up wide, 48 in. long.
5,000 feet 1 in. x 4 in. and up wide, 42 in. long.
10,000 feet 1 in. x 4 in. and up wide, 36 in. long.
25,000 feet 1 in. x 4 in. and up wide, 30 in. long.
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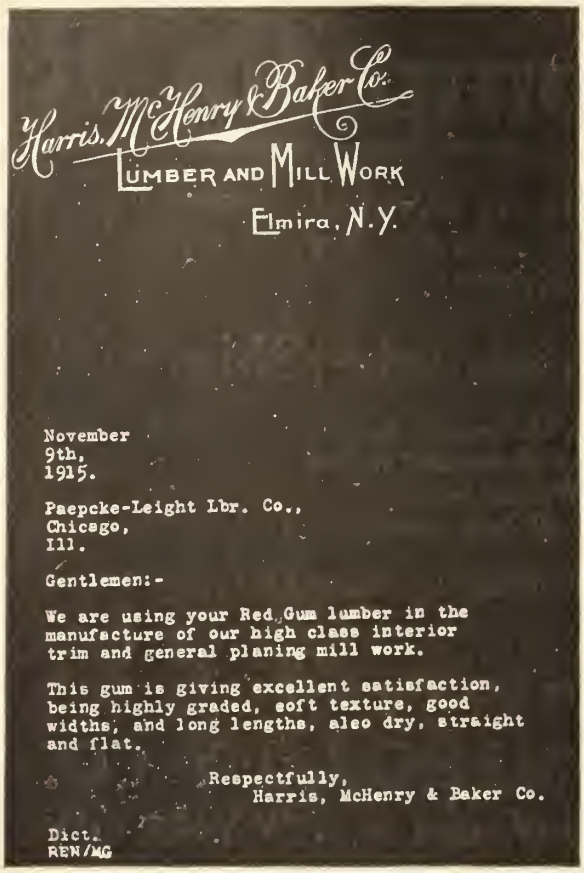
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**A Monthly Publication in the Interest of the Woodworking Industry.
Reaches the factories producing interior finish, doors, sash, flooring, woodenware, furniture, pianos, boxes, and general mill products.**

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Vol. 17 **March, 1917** **No. 3**

Electricity in Woodworking Plants

We have devoted some space in this issue to a consideration of the subject "Electricity in Woodworking Plants." There is no doubt that the woodworking and furniture industries offer a broad field for the application of electricity. Apart from the question of motor drives for machines, there are many electrical appliances that have found wide uses in the factories. Take for instance the small portable drill, the electric edge veneer trimmer, the electrically-heated glue pot, the burning-in iron, etc.; without an exception these have made a difference in the cost of production in the factories where they have been utilized.

Regarding electrically-driven machinery, opinions seem to differ as to whether, in the long run, it is more economical than steam-operated equipment. We believe both electricity and steam have their fields of usefulness. No doubt in a large plant where the boiler room is in charge of a capable man and the shafting, pulleys and belts are kept in good condition, the power costs will compare favorably with an electrically-operated plant.

Those in favor of electric drives claim the following advantages: When a machine is not in use it is not consuming power. When it is necessary for one department of the plant to work overtime to handle a rush order, the overhead charge of operating the entire equipment does not have to be incurred. More flexible arrangement of machines can be secured. And for overtime work the wages of the engineer are saved.

To offset these arguments manufacturers in favor of steam assert that when comparisons are being made between steam and electricity proper credit is not always given the steam equipment for heating the plant and dry kiln. They say further that after motors are installed and the heating expenses are added to the power bills the cost will average up about the same as steam.

A number of manufacturers have written us expressing their opinion regarding electricity and steam. These letters are published elsewhere in this issue, and will no doubt contain much of interest to manufacturers who are interested in the power question.

Furniture manufacturers should find the article by W. J. Beattie, "Motor Drives in the Furniture Factory," in this issue, particularly interesting. Mr. Beattie has had wide experience in operating furniture factories and has dealt with the subject in a very practical manner. The article by W. G. Scrim, of the W. G. Scrim Lumber Company, dealing with his company's experience in operating their planing mill and sash and door factory with both individual and group drives, also contains some valuable suggestions.

Box Factory Costs

At the annual convention of the National Association of Box Manufacturers, Secretary Gifford, speaking on the subject of costs, said:—"I am convinced that I cannot lay too much stress on this question of costs and the working out of a uniform plan that will eventually be adopted by this association. The wooden box industry of the country should have a uniform cost system, and it should be used by every factory, whether large or small. I am confident that the lack of a uniform cost system has been one of our greatest shortcomings, and to this can be charged the principal cause of failures and a general lack of co-operation. If a manufacturer does not know what the difference in cost is as between a large or small box, or a style 2 as compared with a style 1, surely he is not in a very favorable position to sell intelligently. I am certain that if we can work out a system which will not be complicated, and can prevail upon the manufacturers to use it, we will bring about more co-operation in their business than we have ever had."

The importance of knowing the true costs of their products is being realized more and more by manufacturers in every branch of industry. Most progressive manufacturers have some kind of cost sys-

tem, but some of them guard the working of it jealously for fear some of their competitors get to know the details. What foolishness! Instead of keeping their cost finding knowledge to themselves, they should scatter it broadcast, so that all could see. The man that does not keep any kind of a cost system is the most dangerous competitor. He is the man who cuts prices. Why? Because he does not know at what price to sell his goods to make a profit. He bases his prices on those of his competitors, making such cuts as will enable him to take the business. Enlighten such a man to his folly; provide him with details of a cost system, and he becomes a good business man, a safe competitor.

The surest method of eliminating price cutting is to establish a standard cost accounting system for the industry and induce every manufacturer to use it. When they know what their goods are costing them they can use their business and mechanical ability to decrease the costs. If they can then secure the business and make a profit they are entitled to do so.

Our "Safety First" Department

Is there anything more pathetic than to see a strong, able-bodied workman suddenly disabled for life as the result of an accident? Then how much more to be regretted is the result if, with a little care, the accident could have been avoided? An instance which the writer well remembers, will serve as an illustration.

A workman operating a hand feed rip saw wanted to rip a board up the centre in a hurry. He therefore threw the fence out of the way and proceeded to steer the board into the saw. When the board was ripped half way through it jerked back and hit him in the stomach. He sat down for a few minutes to rest and then attempted to work again. Then, not feeling very good, he decided to go home. The next day he was dead.

This man would, in all probability, have been living to-day if he had taken the necessary couple of minutes to adjust and use the fence on the rip saw. The irony of the occurrence was that the superintendent of the plant was about the last man in the world to allow any workman to run the risk of injuring himself.

We believe that a large percentage of the accidents occurring in woodworking plants and furniture factories can be avoided by the use of proper guards and safety devices, and the exercise of reasonable precautions. We have therefore decided to start a "safety first" department in the "Canadian Woodworker and Furniture Manufacturer." This department will be devoted to descriptions of machine guards that have been found satisfactory in actual practice, and also to suggestions that will assist in the preservation of life and limb in the daily routine of factory work. Many a man persists in doing a piece of work in a certain way because he does not realize the danger. The purpose of the "safety first" department will be to point out the danger and suggest a method whereby it may be avoided.

We ask our readers to co-operate with us in making this department helpful, because we feel that it is worthy of their support. No man, we feel sure, would willingly stand idly by and see a fellow workman injured. Yet your action may amount to that if you know of a safety device which will prevent accidents and still keep it to yourself. Send in your suggestions while there is still time to save some fellow's fingers. If the guard which you have in mind requires an illustration, and you cannot secure a drawing or photograph, let us have a rough sketch, and we will have a drawing made.

In a plant which the writer visited recently there is an old style automatic turning lathe that nearly makes a person's heart stop beating every time they are obliged to walk past it. The machine is situated in such a position that no person can walk up or down the machine room without passing close to it, and the murderous looking knives travelling at a terrific rate of speed are unguarded. If one of those knives should happen to fly out it would in all probability mean death to someone. Fortunately, so far none of the knives have worked loose. But one never knows when they will. These are the dangers that should be guarded against. So send us your suggestions.

Course in Woodworking for Soldiers

At the Laurentide Inn, Ste. Agathe, P.Q., a sanitarium where a great many returned soldiers are being treated, a woodworking shop has recently been established. The shop is under the supervision of Sergt. J. R. McLean, formerly of the Glasgow Technical College, Glasgow, Scotland, and Naas Seminary, Sweden. The soldiers start making collar-racks, lamp-stands, etc. It is stated that some of them, however, become very ambitious and turn out some creditable pieces of work. Four classes are held every day, and many of the soldiers are reluctant to lay down their tools when the day's lesson is up, so enthusiastic are they in regard to this new innovation. This training in the handling of woodworking tools should be of considerable benefit to the men when the time comes for them to resume civil life.

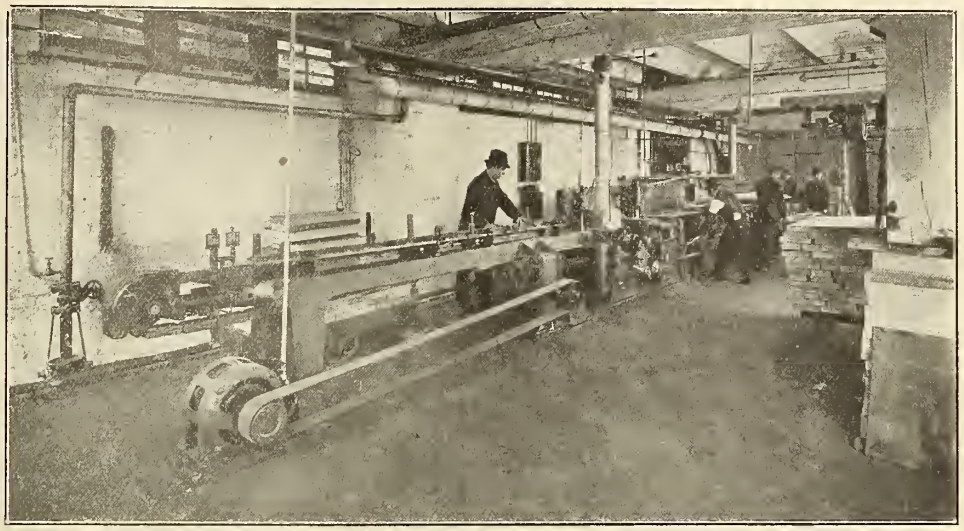
Enquiry for Combination Machine

A subscriber to the "Canadian Woodworker" writes as follows:

"We are looking for a manufacturer of a band resaw and power feed ripping combined, which we saw recently in some one of the woodworking magazines.

"This saw had narrow feed rolls for power ripping attached to the upper guide, with auxiliary resaw rolls, which turned down under the front of the table when not in use."

Any manufacturer who is interested may obtain the name of the subscriber by writing the publishers of this journal.



Section of machine room in Brunswick-Balke-Collender Company's plant.

A Splendidly Equipped Woodworking Plant

Individual Motors for All Machines—Aeron System of Applying Shellac and Varnish—Two Dry Kilns in Finishing Room

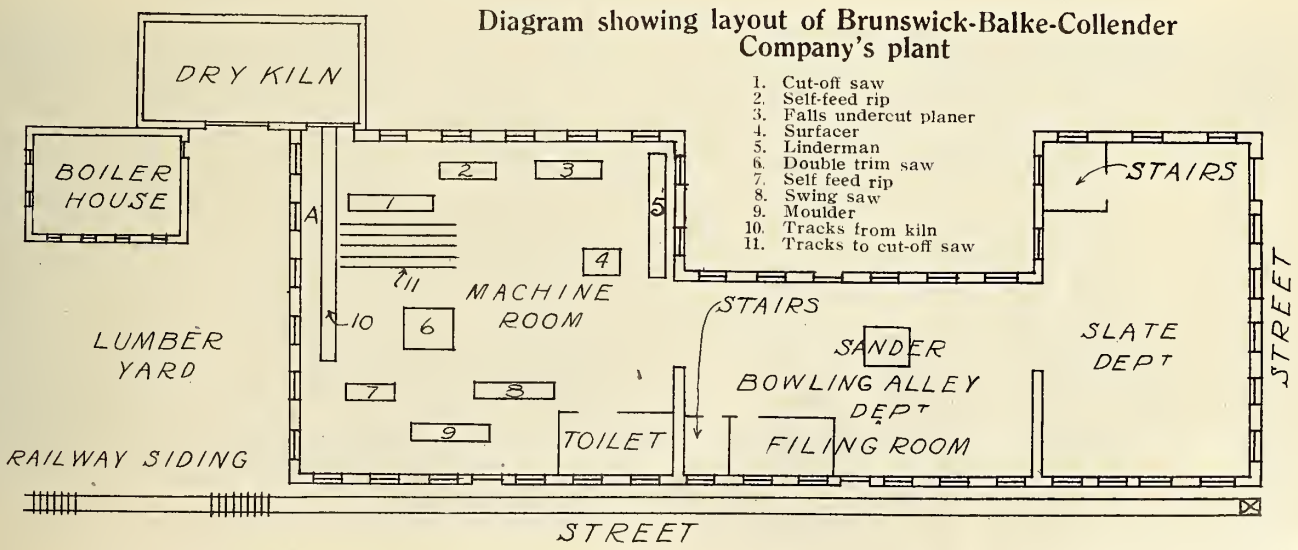
Staff Article

Every facility for the economical manufacturing of high-grade woodwork is provided at the plant of the Brunswick-Balke-Collender Company, manufacturers of billiard tables, bowling-alleys and talking machines. The layout of the plant, the ground floor of which is shown herewith, is arranged with a view to the rapid handling of stock. The lumber is dried in a Morton dry kiln, and when it is ready to be cut up it is run into the factory on cars, and then by means of tracks running parallel to the stock saw (indicated on the layout mentioned above) the lumber is placed at the spot where it is most convenient for the stock sawyer or his helper to unload it. Between the track leading from the kiln and the wall, in the space marked A on the diagram, are racks for piling stock.

A feature of this machine room is that stock can be brought in from the kiln without any outside doors having to be opened. This is an important feature in the winter time, as doors do not require to be opened for very long in order to cool off the shop. The lower floor of the factory, on which the machine room is located, is a few feet below ground, but lack of light is no hindrance to production as it is in many machine rooms similarly located. The reason is that every machine in the Brunswick-Balke-Collender Company's plant is equipped with an individual motor. Thus, with the exception of a few machines that have the

Diagram showing layout of Brunswick-Balke-Collender Company's plant

1. Cut-off saw
2. Self-feed rip
3. Falls undercut planer
4. Surfacer
5. Linderman
6. Double trim saw
7. Self feed rip
8. Swing saw
9. Moulder
10. Tracks from kiln
11. Tracks to cut-off saw



Cabinet room in Brunswick-Balke-Collender Company's factory.

motor attached to the ceiling, all belts and pulleys are eliminated. All motors used in the plant were furnished by the Crocker-Wheeler Company and the Canadian General Electric Company.

The general arrangement of the machines has been worked out with an eye to efficient production. The material for talking machines and billiard tables passes from the stock saw to the self feed rip saw, and from there to the Falls undercut planer and then on to the surfacer and Linderman dovetailing machine. The material for bowling alleys requires different operations and, therefore, takes a different route. One of our illustrations shows a section of the machine room where the Linderman dovetailing machine is located. (Note the almost total absence of belts and shafting).

The other departments of the Brunswick-Balke-Collender Company's plant are no less interesting than the machine room. The veneer room is particularly worthy of more than passing note. The company's products call for considerable veneered work and the equipment provided is of the best. Our illustrations give a pretty clear idea of the size and equipment of the veneer room. One photograph portrays the large belt-driven press, also the block and tackle that travels on a track suspended from the ceiling, and which lifts the heavy parcels of stock out of the press after the clamping irons have been attached and the pressure removed, and carries them back out of the way so that another parcel of stock can be put in the press. The motor which drives the press is attached to the ceiling. The press itself was manufactured by the Black Bros. Machinery Company, Mendota, Ill.

On the opposite side of the veneer room, which is sixty feet wide, the taping machine, jointing machine and band saw are located. The taping machine, with a roll of tape ready for action, is shown in our illustration. The jointing machine is immediately at the back of the taping machine. If the reader looks closely he will see the motor which drives it, attached to the ceiling.

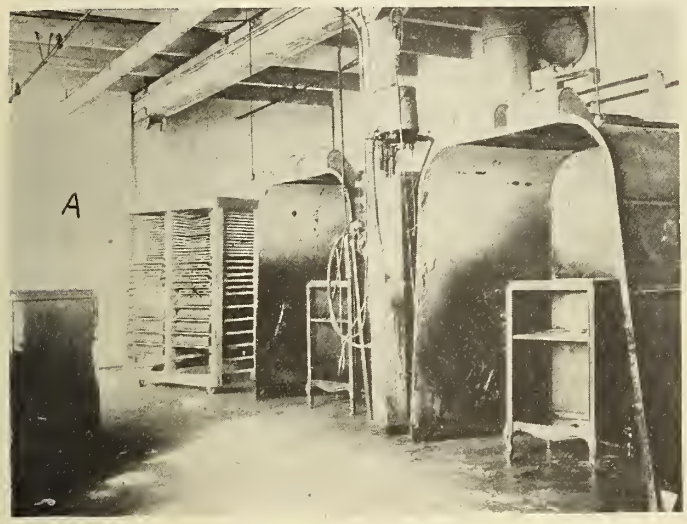
There are two cabinet rooms in this factory, one in which the billiard tables are fitted and assembled, and the other devoted to talking machine cabinets. As may be imagined, the fitting up of billiard tables calls for some very accurate work, both on the part of the machine hands and cabinet makers. In the illus-

Power press in veneer room.

Section of veneer room.

tration depicting a section of the cabinet room, it will be noticed that the heavy billiard table frames are mitred at the corners. This mitering is done on the swing saw by means of forms.

The finishing at the Brunswick-Balke-Collender Company's plant is taken care of in two different de-



Varnish applied by the Aeron System.

partments. The billiard tables are handled in one and the talking machine cabinets in the other. The billiard tables require practically all hand work, whereas for the talking machine cabinets, all the short cuts are utilized. Our illustrations show a section of the billiard table finishing room, and the room where the talking machine cabinets are varnished. The varnish is applied by the Aeron system, and the equipment was furnished by the DeVilbiss Mfg. Company, Toledo, Ohio, U.S.A.

By using the arrangement shown in the illustration, namely, two fumexers with one spray, and a helper to place the work for the operator, the cabinets can be varnished rapidly and efficiently. In another room, which is entered by the door marked A, the staining, filling, and shellacing is done. The shellac is applied in the same manner as the varnish, another of the Aeron type machines with two fumexers being used. This makes two sprays and four fumexers in use at this plant. The first cost of the extra equipment is offset by the facility with which both shellacing and varnishing may be accomplished, both being done at the same time.

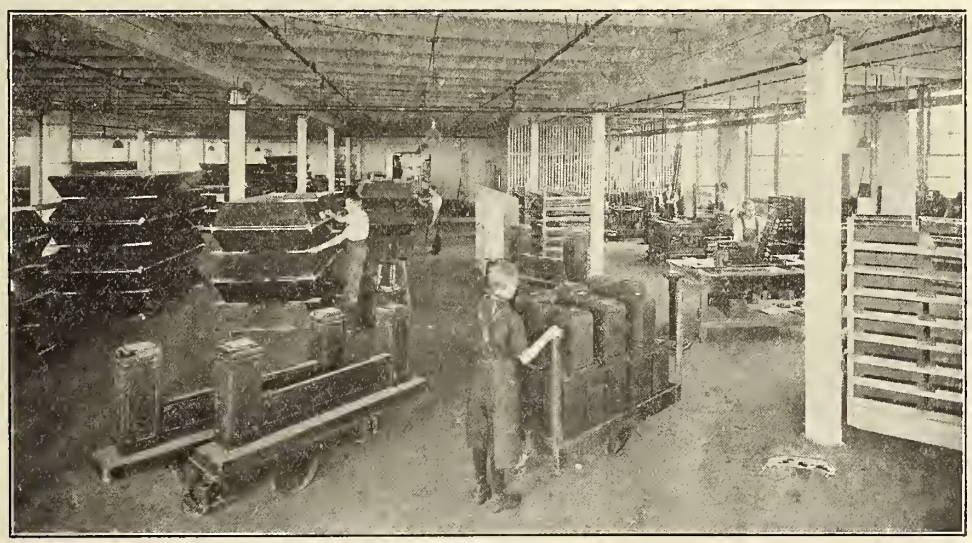
After the finishing materials have been applied the cabinets are placed in a dry kiln to dry. The dry kiln is divided into two compartments, one for stained and filled work and the other for varnished cabinets. The dry kiln equipment was purchased from the Greeff Engineering Company, of Newark, N.J. Mr. Weicker, the manager and superintendent of the Brunswick-Balke-Collender Company's plant, says that the time for drying finishing coats can be cut in half by using a kiln.

Method to Prevent Heating of Saw

An innovation is in practical use in the planing mill and box factory of the Hamilton & Ridge Lumber Company, Estill, S. C., that probably is not employed anywhere else at the present time, says the American Lumberman. The band saw blades used upon the horizontal resaws have a row of 1¼-inch holes punched in the back, two inches from the back of the saw and three inches apart from center to center. These holes are intended to carry the sawdust through the cut and prevent heating of the saw. This method has been used for about two years and is said to produce remarkable results.

Atlantic Lumber Company Purchases Band Mill

The Atlantic Lumber Company, Inc., have recently purchased the band mill, railroad, equipment and standing timber of the Valley Creek Lumber Company at Fonde, Ky. The timber consists chiefly of yellow poplar and white oak, and the Atlantic Lumber Company will specialize in the manufacture of white oak dimension timbers. The mill will commence sawing in a few days.



Brunswick-Balke-Collender Company's billiard table finishing room.

Preston Woodworking Machinery Co. ball bearing shaper connected to motor. Shaft passes through motor and supports pulley on each end.

American Woodworking Machinery Co. 30 in. cabinet surfacer direct coupled to motor with flexible coupling.

Motor Driven Machines in Furniture Factory

Discussing the Relative Advantages of the Individual and Group Drive—Connecting Motors Direct to Machines—Converting the Steam-Driven Plant

By W. J. Beattie

The old saying that "Coming events cast their shadows before," was particularly appropriate regarding the use of electric energy as motive power for factories. Electricity is daily becoming a more positive force on account of its many advantages, some of which we will try to substantiate in the course of a short article.

Naturally, the first question is: Why is electric drive more suitable for a furniture factory than steam? The answer is, in the last analysis, flexibility and economy.

There are two general ways of using electric power, the one of individual motor driven machines; the other the group drive; that is, one motor of sufficient power driving, say, up to a hundred feet of shafting, with the attached machines, as a separate power unit.

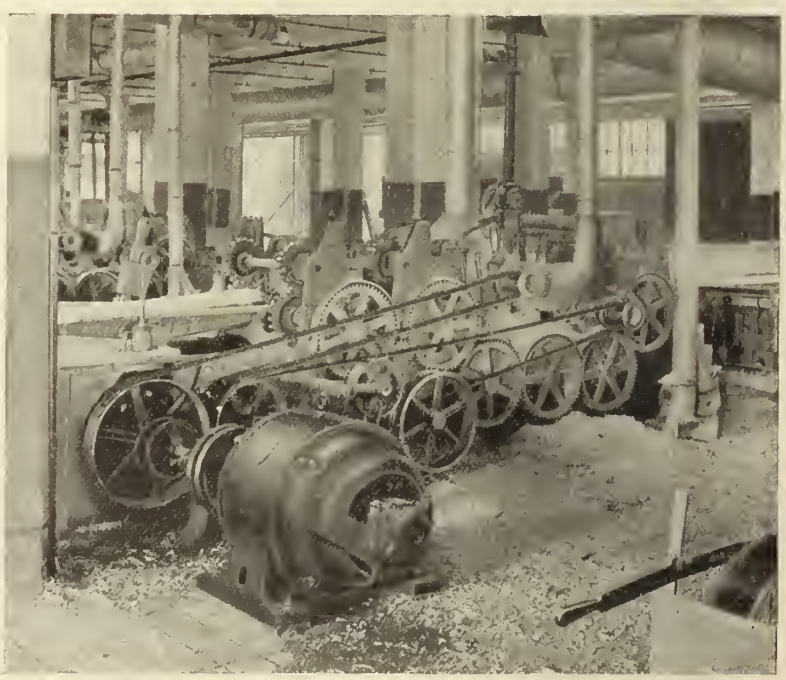
We will consider the individual method first:

This plan is the ideal method of transmitting power, as; first, it does so with the least loss; second, the machine can be placed in any position with the greatest possible ease of operation and light, and in proper sequence to other machines; third, the self-contained machine can be easily moved to a more desirable position, if such is evident or necessary through any change of product or process of manufacture, with the minimum of labor and time.

The above three reasons are the principal arguments in favor of individual motor driven machines.

Consider reason No. 1 first: It does not need a string of mechanical calculations in cold figures to convince even a novice, much less a practical man, that the farther away your source of power is, the greater the loss in transmission. Consequently, the more direct you can couple your motor to the actual working parts of a machine, the better and greater results are apparent.

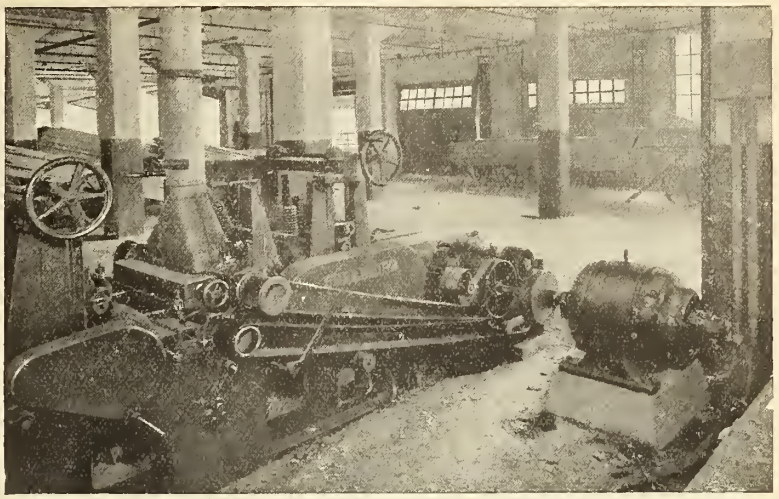
One of the principal things in motor-driven machinery, in fact the real thing, is to do away with every foot of belting possible, and this has been done in some cases, in a very ingenious manner. The more conservative manufacturers; also employees, (and they are in the big majority) will look rather skeptically at a planer having a motor directly connected to one end of the cylinder head, (see accompanying illustration) thus doing away with the countershaft and all belting other than the small feed belts. Yet the connection of power directly to where it is used is accomplished in a perfect manner. There are no belts to slip and wear holes in the expense account, in a dual way. There are, of course, planers electrically driven that have the motor attached to one end of the countershaft, having pulleys belted to the cylinder in the usual manner, the whole frame of the ma-



Wagner 30-H.P. B. W. Type (self starting), three phase, 850 r.p.m. motor direct coupled to American moulder.

chine being cast in one piece. The greater speed of the countershaft makes for smaller pulleys and shorter belts and has as large an arc of contact in the driven head as is now obtained by the overhead countershafts, with the added advantage of a horizontal belt. A planer like the foregoing is more suitable for a planing mill, where longer material is more general than in a furniture factory. Such a machine, being self-contained, is movable, but is not nearly so compact a tool as the direct connected one.

The triple drum sander is also built having a small motor attached directly to the end of each drum shaft, making it possible to run one drum only, which is really all that is required for considerable of the work that has to be done. Surely this is a big saving in power, as an ordinary sander will consume 20 h.p. under an average load, with three drums going.



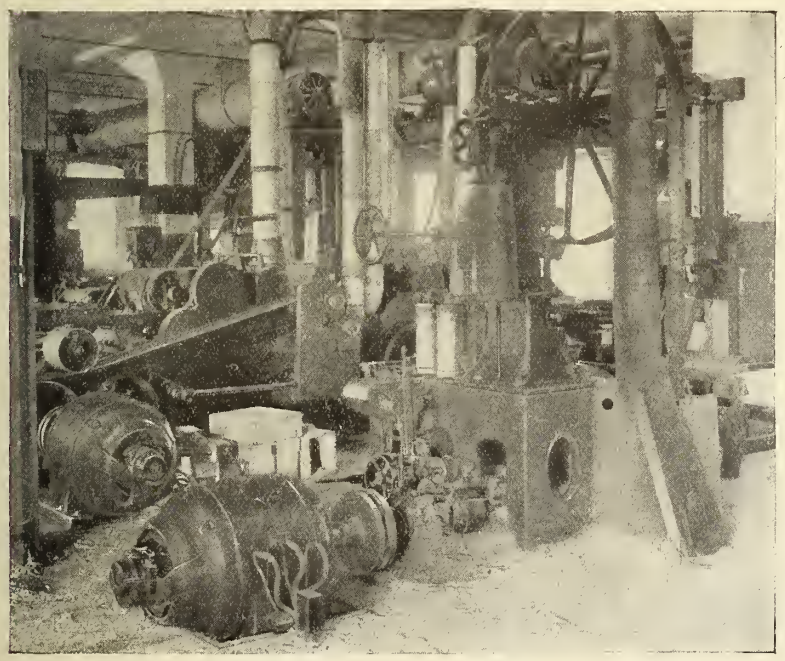
Wagner 30-H.P. B.W. type (self starting), three-phase, 850 r.p.m. motor direct connected to Berlin double surfacer.

There are some of the indispensable machines that will still be more or less dependent on belting for the counter drives, such as the sticker or moulder. In this case the motor would be at one end of the countershaft, (see illustration) and as the frame of the machine always carries this with it, it makes a compact arrangement. Individual motors can be attached to the two horizontal heads, and some machines are made to accommodate them. In this particular case that innovation is not so likely to attract notice. The swing saw has its motor attached to the countershaft, and has the usual belt from that to the saw, which is the only practical way for a machine of that type, though there are newer ideas in connection with the "first" cut off saw.

The motor of the double cut off saw, also the tenoner, is attached to the countershafts, though there are exceptions in some machines of the double saw type that have been built for special work, and have motors on the arbors.

The old factory favorite, the shaper, has been completely "skinned" of leather, which is needed very much for other purposes. This has been accomplished by having the spindles equipped with cones, which engage disks on a horizontal shaft to which is attached a motor. This is an especial advantage, as who does not know of the wear and tear of quarter twist shaper belts? The above shaper is fitted with ball bearing spindles and consumes less than one-half the power of the belt-driven machine. When you count the loss by belt slippage, the minimum will be 30 per cent. as against the maximum loss of 3 per cent. of the cone and disk drive method. Surely this is a large margin in favor of the up-to-date shaper? A photograph of a shaper connected in this manner was not obtainable, but an illustration of another satisfactory method is shown.

The band saw is a very easily connected machine. It is made with a motor on the end of the lower arbor, and also with the motor a few feet away, the latter being belt connected. These remarks are numerous enough to show the practical application of electric motors to the individual machines.



Wagner 25.H.P. B. W. type (self starting), three-phase, 580 r.p.m. motor direct connected to resaw.

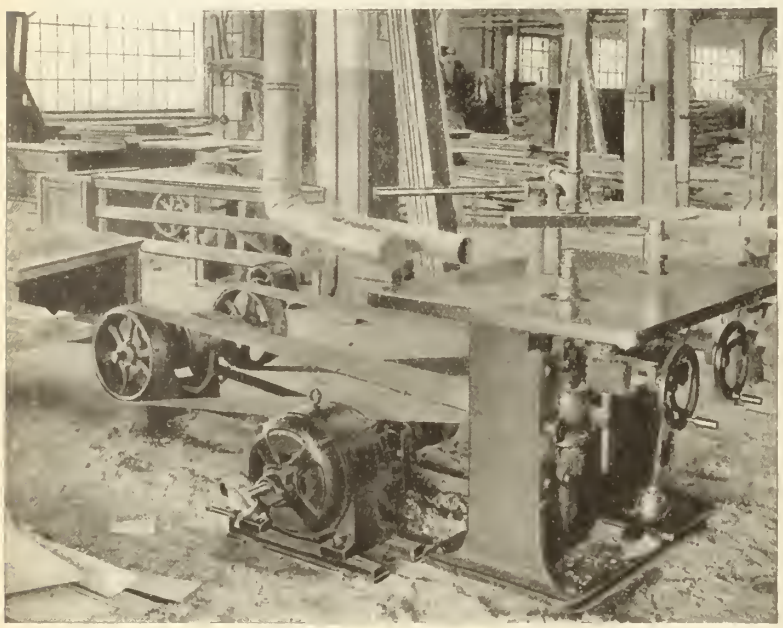
Easy to Move Machines

Referring to the moving of machines from one place to another, there are only the exhaust connections to consider as at all serious, and as each machine carries its own hoods, flexible joints, etc., the connections are usually very easily made. The motor feed wires are easily attached, so that a machine can be moved and running in a fraction of the time required in the majority of plants, at present.

A word about the exhaust fan, that power glutton that is feeding continually, provides a good object lesson for consideration. The "wind jammer" is invariably hung up to the ceiling, and with the attendant vibration generally makes life miserable for anyone working in the overhead vicinity. A double exhaust fan with motor direct, bedded on a concrete foundation, is one of the assets of a well appointed factory, and if fitted with a variable speed motor the power required can be reduced to that actually necessary. In such cases it is always wisdom to put in a fan of generous capacity and run it as slow as requirements demand. As

more piping and machines are used, the fan can be speeded to take care of the volume.

The usual argument against individual motor driven machines is the one of initial expense. It is trotted out as sufficient answer to all progressive ideas on factory improvement. It would present a good subject for discussion on its own merits, and it is very doubtful if the cost of building and equipping an electric plant as against a steam driven factory would offer any satisfaction for those who hold the opinion that initial expense is greater in the case of the motor-driven one. Stand at one end of a machine room that has its lines of shafting, pulleys, countershaft, belting, etc., that can be all done away with, and contrast it with the brighter, lighter, airier and cleaner machine room of the electric age. Which would you vote for if you were going to indulge in the fascinating work of building a factory this coming spring? Of course, you would have the motor-driven machines.



Another method of "hitching" a shaper to a motor

Converting the Steam-Driven Plant

The conversion of a steam-driven plant into an electric one, using the same machinery, and making it a group-driven plant, is a matter of personal experience, and may therefore be of interest here. The plant used as an illustration is situated in a city where hydro power is available at a reasonable figure, and as some changes were being undertaken, including a considerable addition to the building, the time was opportune for the introduction of the "juice." In due time the addition was built and ready for the hanging of the shafting. This was the very best obtainable, and was hung in Chapman Double Ball Bearing boxes.

There were two lines of shafting running the full length of the machine floor of the new annex. These were each driven by an electric motor, belt connected, the motors being suspended from the ceiling, and quite close to each other. This saved floor space, which, of course, was the principal object. But even in spite of careful installation, iron rod bracing and good new spliced belts, the floor immediately above the motors vibrated too much for the men who worked there, and there were complaints. Please note this was a new brick building, and that it would quite likely have been much better if the motors had been erected on structural steel frames bedded in concrete in the earth. There would have been a loss of some floor space in one flat, but it would have been, at least partially, offset by the gain above, and there would have been no strain on the building. However, that was the largest "fly in the ointment" and everything else worked very nicely, so the first step was considered quite successful. In the older portion of the factory a motor was installed to run the babbitt-bearing shaft, and the steam engine was given a holiday.

Power Comparisons

The lines of shafting that were hung in ball bearing boxes were approximately the same length as the babbitt-bearing shaft, so that here was a good chance for power comparisons to be made. These comparisons were made on a Saturday afternoon, which was the weekly half holiday. Every belt was taken off the shafts, so as to reduce the test to as fair a comparison as possible. As it is very easy to ascertain the power an electric motor consumes in a given time, there was no doubt about the result, which was so decisive that the babbitt shafting was to be replaced by a new one having Chapman Double Ball Bearings.

A record of the power required by the babbitted shaft was kept for reference and comparison with the new shaft, which was run under exactly the same conditions as to speed and pulley weights, and showed the power consumption to be one-third that required for the old shafting. Please note that the old shafting had been put in perfect alignment and the boxes in proper shape before the power record was taken.

This digression on shafting may be somewhat away from the subject, but these things dovetail into each other so intimately that it is almost impossible to separate them.

The double exhaust fan in this plant was run by its own motor, belt connected, and could thus be run at any time independently of the rest, if required.

A manufacturer is more apt to look for economies when he is buying his power from outside sources, as the bills come in regularly. Comparisons for each month's expenditure are sure to be made, and anything that will help to reduce this expense is always sure of discussion. Ways and means will usually be sought to effect a saving. An electric motor is a sure indication of power consumption and is treated with consequent respect. It is quite obvious that in a steam-driven plant of average equipment there is a tremendous loss of power, and the subject is only periodically or spasmodically attended to. Losses thus go on because there is ignorance of the facts. In one plant that the test was put on, it required seventy horse power to run the line shafts with belts on the loose pulleys. That had been going on for years—not a large plant either—about 400 feet of line shafting.

It is a fact that very few manufacturers can tell how much per horse power their steam-driven plants are costing them per annum, as they do not know in the first place how many horse power they consume. Answers are only approximate and generally show a very wide margin. It used to be considered a fairly

good guess that power cost $40 per annum per horse power.

The group-driven plant is the second best kind of a factory. It is just that much more flexible than steam power.

Generating Electric Current

There is also the electric, steam generated plant, which is worthy of some consideration. It appeals to some on account of its independence of outside sources for current. It should be such that it can be connected without delay to public owned supply, when price so dictates. During the season of fuel shortage, and consequent high prices, such as we are experiencing at present, it would seem that a supply of outside energy would be, in almost every case, the wisest course to adopt, unless you could generate your own power by water.

In the natural course of events, coal is bound to be dearer, and it is only by public use and development of our water powers that we are going to insure ourselves a full supply of electric energy. It is quite well known that in towns and cities using hydro power, the greater the horse power used the cheaper it is for the individual, hence the burning question of power development.

Engineer as Electrician

The argument may be advanced that it is still necessary, if you change to electric drive, to keep a man with an engineer's certificate, and thus do not free yourself of that expense. Personally, I have found that all engineers worthy of the term, have considerable knowledge of electric motors. It is quite easy to increase that knowledge, and a man can fill the dual position of fireman and electrician on all average jobs.

In the equipment of an electric plant it is wise to have two or three extra motors for any emergency, to take the places of any "hospital cases." Also, do not fall into the mistake of using motors not having good margins over actual necessities, in the power requirements. To say that a motor will run with a fifty per cent. overload almost continually does not sound like truth. As a matter of fact, it will heat up and burn out, causing delay and loss, as has been the experience of those who were easy enough to believe such foolishness.

To sum up, the writer submits that the best equipment is the individual motor drive. It is economical, more flexible, cleaner, safer and healthier and appeals to all right thinking manufacturers who consider their own interests and those of their employees.

By searching diligently you can usually find out a reason for "bad luck." As a rule it is nothing but a convenient excuse for lack of energy, lack of persistency, lack of diligent thinking, and planning, and striving, and stick-to-itiveness. "Bad luck," laziness, indifference, shiftlessness, and shallowness are near relatives, if not always brothers.

You may believe and think many things, but it is only what you actually do that counts or shows in the final results.

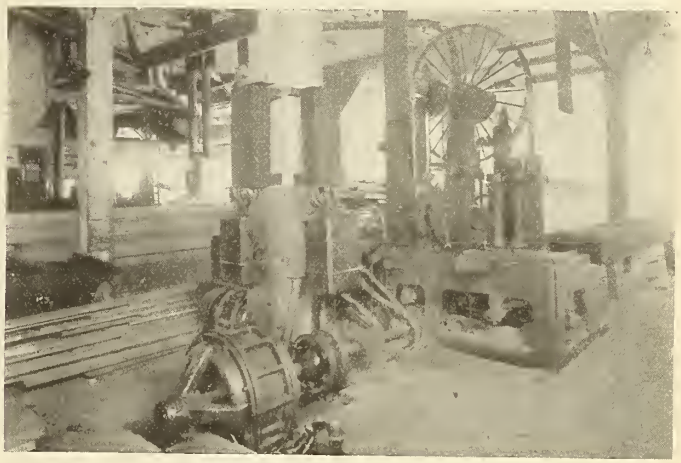
Poor material, animate or inanimate, implies poor work, and in the end those who employ incompetent workmen are the largest losers.

Electric Drive for the Planing Mill

By W. G. Scrim, of the W. G. Scrim Lumber Company, Vancouver, B.C.

Our mill has been operated for some years by electric drive. We have a total installation of 317½ h.p., motors varying from 5 to 50 h.p., operating on a 220-volt, 3-phase, 60-cycle service, delivered by the British Columbia Electric Railway Company, Ltd.

The feeders come into a main switchboard panel, equipped with circuit-breaker and switch, and pass to



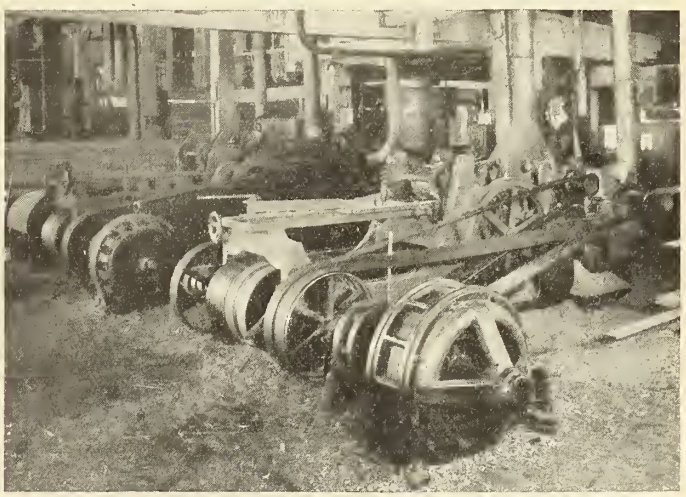
Motor direct connected to resaw.

distributing panels, each equipped with switch and fuses, hence to the various motors throughout the mill, all motors being protected by overload relays on the starting compensators.

All wiring is done in accordance with the rules of the international code of underwriters, and no wiring of a temporary nature is allowed. It is felt that this is the secret of eliminating electrical troubles. The performance of the motors has been excellent, and they have suffered practically no depreciation in value.

In a discussion of the comparison of electric drive with steam drive for a planing mill, the advantages must be looked at from an efficiency as well as an economical point of view—that is to say, the resultant increased output from the same equipment as well as a reduction in the operating expenses. Whether the season is a slack one or rush, the cost of operating with motors varies almost directly with the output. The reasons for this may be given as follows:

During the rush season no troubles develop in tak-



Individual motors in plant of W. G. Scrim Lumber Company.

ing care of the heavy load, whereas with a steam plant it is often a burden. There is no drop in speed of machines due to the creeping or slipping of belts, or slowing down of engines under heavy load, or loss of steam pressure; no belt or line-shaft troubles, which are often serious, especially when the main drive belt shows signs of weakness. This steady speed under heavy load, which is given by the electric drive, allows the feeding of machines constantly up to capacity. There are no overtime costs for engineer or firemen when night shift is employed—i.e., the only men working are on producing machines, with a reduction of overhead charges on rush work. Every machine is a unit in itself.

During the slack season the above arguments for overtime work apply; the overhead charges decrease directly with the output, as far as the cost of operation is concerned. Thus, generally speaking, it can be seen from the foregoing that there is an appreciable increased efficiency and economy in operation.

One interesting feature of the electric drive is that it allows the placing of machines in any position and at any angle desired, which is not possible when the machine has to be lined up to the line shaft; also the appearance of the mill is neater, and there is less vibration and confusion, with better light and easier operation.

The planing mill and resaw shown in the photographs each have a capacity of 40,000 feet per day. These machines are all individually driven.

Our sash and door factory has a daily capacity of 100 doors and 400 sash. The machines in the sash and door factory are "group driven"—that is to say, the factory is divided up into groups of machines which are likely to be used at the same time, and each group driven by one motor. In this case the belting and shafting is light and short, and there is a saving in the capital outlay which would otherwise be spent in purchasing unnecessary motors, for were each of these small machines driven by a separate motor it would have to be large enough to carry the full load of the machine, whereas in the group drive the average load is considerably less than the aggregate load of all the machines, and therefore the motor capacity is smaller in the same proportion.

This raises the question in electrification of a factory as to what machines should be individually and what should be group driven. This should be very carefully considered, with the advice of an experienced engineer. However, the writer suggests that the capital outlay should not only be considered, but also the cost of operation. Most central stations set their rates and minimum charges on the total horse power connected; this should, therefore, be kept as low as possible and as high a load factor maintained as possible without risk to the motors of prolonged overload demand.

Our company appreciates, also, the ease with which power costs are estimated; all the bookkeeping is done by the central station, and it is a very simple matter, month by month, to compare power costs with the output. Roughly speaking, for the planing mill, this averages about 25c per 1,000 feet. The company is also relieved of all the problems of a steam power house, and is able to devote more time to the requirements of the factory.

The dry kiln is heated from a 100 h.p. boiler, the steam being super-heated in the refuse burner. It would certainly idealize the plant if this could also be heated economically by electricity.

In conclusion, the experience of the W. G. Scrim Lumber Company, Ltd., for the past three years has proved that the electric drive is a source of profit to the mill, and its many advantages are more easily experienced than described.

The Fitting of Band Rip Saws

By S. H. V.

The subject of band rip saw fitting is a difficult one to explain. No two filers will agree to the same method, because each and every filer must fit his saws to the machines they run on and the different grades of stock they have to cut. He must study the machines and stock and settle on the right amount of tension, heart and strain the blade requires; also, the proper hook to the teeth that will be necessary for each kind of stock without interfering with the output of the machine. He must keep in his mind that a band rip saw is built to handle every variety of stock quickly and economically, and that they are supposed to be both stock and trim saws.

In taking the saws off the machines I go over them very carefully to find any possible cracks that may have occurred. If there should happen to be one, I stop it by punching with a moon-shaped punch half way through the blade, with the face of the moon to the bottom of the crack. I then let out the tension for about two inches each side of the crack, keeping that part perfectly flat. I then go over the blade with the back gauge to see if the back is converged 1/64 of an inch in four feet.

If the saw has stretched I roll the back edge, not going any closer to the back than one-half inch. After the heart is corrected I go over the blade on the outside for lumps. Then after I have levelled the outside I go over the inside, always taking care not to hit the heart with the hammer, for it is a simple matter to knock the lump right through. With all long and cross faced lumps out I am then ready for the tension, which I adjust with the rolls.

I carry just enough tension in a 4-inch blade to fit to the segment of a 45-foot circle. This I have found to work satisfactorily. I might say I do not tension my brazes at all, preferring them perfectly flat, three inches each side. Now, in coming to the teeth, I believe in swaging often and light, as it is easier on the swage and the saw steel. In swaging I put one gauge more than I want and then dress the face with the emery wheel. After that I swage the shape to six gauges more than the gauge of the blade, and then grind until I have a nice keen cutting edge.

Some filers believe in a lot of hook, but this is another case where one has to be guided by conditions. I have found that 1½ inch of hook on a 4-inch blade will suit any kind or thickness of wood without diminishing the feed of the speed.

I have found that on a band rip saw the ground steel gives the best results, as you do not, in feeding your saws this way, require such a heavy strain, and it is easier on both the machine and the filer. I run my saws ten hours under every circumstance, and have gone four months without the sign of a crack. If there is any further information which I can give to readers of the "Canadian Woodworker" on the subject of band rip saw fitting, I will be glad to do so.

More men fail through ignorance of their strength than through knowledge of their weakness.

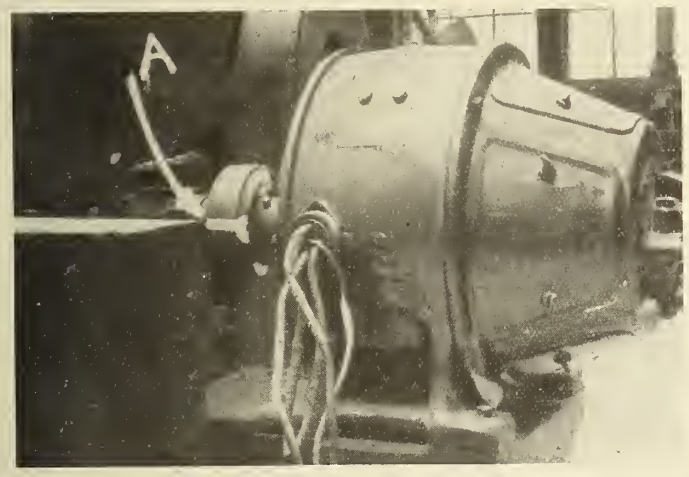
Direct Connecting Motors with Flexible Couplings

By C. D.

The application of electric drives to woodworking machines is like everything else—it has to be given careful consideration. This is especially true where machines are to be direct connected to motors. For instance, a machine like a surfacer, having a spindle running in bearings apart from the motor bearings, should never be direct connected by means of a solid coupling. Even if perfect alignment is obtained, it is inadvisable to use the solid coupling, as the slightest vibration will jar the shafting or bearings and cause trouble.

For machines of this type flexible couplings should be used. There are several styles of flexible couplings on the market, two of which are shown in the accompanying photographs. One of these, the reader will notice, is like two pulleys with a collar between them, having tooth projections which fit into corresponding grooves in the pulleys. This coupling was furnished by the Garlock-Walker Machinery Company, the Canadian agents for the American Woodworking Machinery Company, on one of the latter company's surfacers that is direct connected to a Westinghouse motor. It has been running for a considerable period now and gives excellent service. It has just enough play to absorb any jar that may be caused on the shafting or bearings.

Another flexible coupling that is sometimes seen closely resembles the one already mentioned. The only difference is that it has pieces of rawhide rivetted



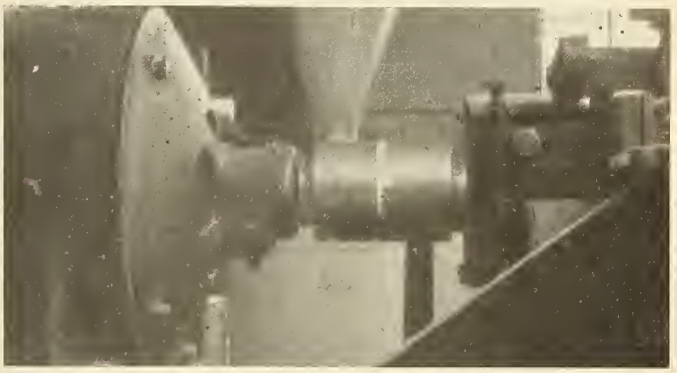
Motor direct connected to power feed rip saw with flexible coupling

on each side of the tooth projections. In one case that the writer knows of, a coupling similar to the above was supplied with fibre rivetted to it instead of rawhide. The fibre did not prove nearly as satisfactory as the rawhide.

The other coupling shown here gets its flexibility from four round pieces of rubber, which are secured under the outer rim. One of these pieces is shown at A in the illustration. This coupling is furnished by the Preston Woodworking Machinery Company, of Preston, Ont., on their machines that are to be direct connected to motors. The one shown connects a power feed rip-saw to a Westinghouse motor. It has been in operation long enough to demonstrate that it fulfills the necessary function of flexibility and at the same time makes a very smooth running coupling.

Another type of flexible coupling has two flanges, with bolt-like projections on their inside faces. The projections on each flange are at a different radius, and an endless belt is interwoven around them. This coupling is more complicated than the two illustrated and is more of a nuisance to "hitch up."

Flexible couplings, besides solving the difficulty of



Flexible coupling connecting motor direct to surfacer spindle.

imperfect alignment, form an insulation between the motors and the machines. They also afford a little end-play in the motor bearings.

A Word of Praise

Have you ever stopped to consider the value of a word of praise? Our factories are full of men who hunger for a word that is never spoken. A man can never do his best unless he has some evidence that his efforts are appreciated. Recently the writer was talking with the mechanical genius of a piano factory. He was not a superintendent, neither was he a foreman, and one could not call him the 'handy man.'

His power was greater than any of these because of his peculiar mechanical ability. All problems that could not be solved elsewhere were brought to him. I knew that his employers thought the world of him, but he told me that he had not the slightest idea regarding their opinion of him, and then, after a moment's pause, he added: "I would give almost anything to know what they think of me up there."

Shortly afterwards I learned that he had quit and accepted another situation; but before he left he found out how they valued his services. They offered him a considerable increase in salary, but he was tired of living without a word of cheer.

Some men are afraid that a word of praise will encourage the employe to ask for an increase in wages. If he is worth more money he ought to get it without asking for it, and if he is not worth it a word of cheer and praise might urge him to greater efforts. It is not necessary that a man be worth more money than he receives to entitle him to a little praise. In these days the man who does his duty is a valuable man.

A word of praise does not always encourage a man to ask for higher wages. Many a man has been deterred from asking for more money by a word of praise lest his employer would think he was taking advantage of his kindness.

A word of appreciation is an easy thing to give, and it helps to cheer one in his efforts to do his best and to please his employer.—Furniture Manufacturer and Artisan.

Remember that circumstances are a strong factor, and largely determine one's future. Nobody can add an hour to his life or absolutely control it.

What Manufacturers Say about Motor Drives

Absence of Belts and Shafting—Flexibility of Machines—Reduction of Fire Risk—Saving the Expense of an Engineer— Well finished Products

We are pleased to inform you that on an approximate estimate which we have gotten out, covering a period of eight months, the average cost in cents a kilowatt hour per thousand feet in board measure was 38.6. This cost covers the planing and resawing and cutting up into box shooks of about an average of 680,000 feet per month for four months.

In 1910 we bought out an electrically-driven box factory of 50 h.p. in Vancouver, B.C. There was a small transformer on poles outside the building. Now we have electric current of 700 h.p. waiting for our use, at present using but half the capacity. Our switchboards and transformers are located in brick and cement vaults with iron doors. Wires into building are all underground. We know nothing about steam power, so can offer no comparison. Remember, electricity is for power, not heat; at the coast we do not need heat in a box factory. We buy our power from the Western Canada Power Company, and the service has been next to perfect. All told, thirty hours since 1910 would cover our hold-up for want of power. We, as large users, get a low rate, but an Ontario manufacturer tells us that in comparison with ours their rate is next to nothing.

We like electric power. All our machines are direct connected. Power ready for use every minute, day or night. Electricity is clean. Electricity is safe. Electricity properly installed reduces fire risk, and consequently lowers the insurance rate. Unacquainted as we are with the merits of steam power, it is but reasonable, with our experience, that we should boost electric power. Wherever you find a machine in our plant you find a motor attached of sufficient horse power to drive that machine. We have at present thirty-seven motors, ranging from 2 h.p. to 80 h.p. Our motors are of Canadian Westinghouse, Canadian General Electric, and Lancashire makes. Our total motor capacity is 620 h.p.

PACIFIC BOX COMPANY, LTD.,
Vancouver, B.C.

* * *

Electricity Reduces Fire Risk.

Electric power has made good with us for the various uses where it is employed. The first cost of installing a generating plant and motors is high, but the upkeep we have found to be less than with steam power. Care must be taken, however, not to overload either the generator or the motors. The result is liable to be the same as ploughing heavy sod with a pair of thoroughbreds—the work will be done, but something is going to give way before long.

We are using about 750 h.p. around the sawmill, to run planers, resaws, sizers, conveyors, sorting tables, lath mill, slab slashers, blowers, machine and blacksmith shops, and about another 300 h.p. in the box factory, and within a few weeks a separate generator, with a capacity of 280 kw., will be running our new shingle mill, with its conveyors, dust-collecting system, lights, etc. We use Westinghouse motors throughout . Our electric light generator was made by the Allis-Chalmers-Bullock Company, of Montreal, and the large turbine generator by the same company, at Milwaukee, Wis.

Electrically-driven machinery reduces fire risk. We had two bad fires at the shingle mill, both caused by hot boxes. That risk will be greatly reduced in the new mill. The cost of maintenance is less than with steam, which necessitates an elaborate system of shafting and belting, with great wastage of belting and oil. Stops for repairs are fewer, and starting and stopping are more quickly accomplished.

There is also a co-operative feature which we have found of great value, especially as there are many points where power is wanted intermittently, such as loading heavy timbers, for instance; the instant the timber is dropped the power is available and actually used elsewhere. This lightens the load on the generator. That system of co-operation between motors is going on all the time.

We do not wish to be understood as advocating electrically-driven machinery in all woodworking mills and plants as against the old steam engine. For instance, saw and shingle mills operating in the woods would no doubt find the installation too expensive. We believe that steam will there hold its own for the present at least. But in any situation where power is wanted in a great variety of ways and places there is considerable advantage in electricity.

If you wish, for instance, to run a band-saw alongside your ship in process of construction, the power can be quickly brought to the exact spot required by means of a wire. Then you can have a little motor in your stable loft to cut and crush the feed, etc.

There is no end to the ways in which electric power can be used around any large plant.

BRUNETTE SAWMILL COMPANY, LTD.,
New Westminster, B.C.

* * *

Depends on Local Conditions.

Our mill is operated by electric power, but from one large motor. In this district the electric power is supplied on the flat rate, which is the reason for our operating with one motor. If the power was by meter or measured service we would operate each machine by separate motor or divide the mill into different sections.

From our point of operations we find the electric power very economical, both from the operating standpoint and also on insurance. In reference to the advantages obtained in choosing between the electric and steam power, many things would have to be considered to provide the best service with the class of business done. For instance, the item of kiln-drying is very essential in the operations of a woodworking plant, and unless this service could be conveniently obtained from neighboring sources the electric power plant would be considerably at a disadvantage, unless this work could be done in a practical and economical way by electricity. We are not aware of any dry kiln so operated.

There is then the heating question. A mill that is not heated is very hard on the machinery, and the men cannot accomplish the best results, especially in this North country. Also, there is the question of shavings and sawdust. This is either a big advantage or a considerable drawback. If the mill is located where a good market can be obtained the electric power has

this advantage, but if there is no market it is a very burdensome commodity, not only causing considerable labor, but it may also affect the insurance.

Then the cost of electric power must be considered, whether it is supplied on the flat or by meter or measured service. If on the measured service, you merely pay for what you use. If the flat rate you pay in accordance with the size of your motor, whether the power is used or not. So in closing, our opinion as to the advantage obtained in choosing between the electric or steam power is that it depends entirely upon the local conditions.

CASEY-SHAW LUMBER COMPANY, LTD.,
Sudbury, Ont.

* * *

Motors for Auxiliary Power.

Our factory is driven mainly by steam power, but we have one 30 h.p. and two 20 h.p. motors installed as auxiliary power. We find them very satisfactory indeed.

The reason we installed these motors was that our steam pressure was cut down, owing to the age of the boilers, and we found difficulty in getting sufficient power to take care of the sudden load thrown upon the engine.

When some of the heavier machines, such as our three-drum sander and 15-inch moulder, were put in action the trouble was particularly noticeable. By putting these machines on individual motors we are able to give our engine a steadier load and a much lighter one, consequently the motors have been of great assistance.

There is no doubt in our minds that electric motors are very satisfactory for a woodworking plant, as far as their efficiency is concerned, but there are many points to consider before installing motors throughout, unless a generator is put in to supply the power. In our case we use exhaust steam during the summer months for the dry kiln, and for heating in the winter months, so that we need our steam plant all the year round.

When we are busy, and making plenty of fuel, it is economical to operate the steam plant, as we burn very little coal, but during a slack period there is no doubt that much can be saved by electric motors.

W. H. CLARK & CO., LTD.,
Edmonton, Alta.

* * *

More Economical Than Steam.

We have 18 motors, operating 26 machines, and consider electricity far more economical than steam power. To begin with, it would cost us nearly as much for an engineer to operate a steam boiler for our plant as it costs us now for our electricity. Secondly, it is not necessary to have your factory filled up with line shafting and long belts. Thirdly, we can operate any one machine, without having to go to the trouble of taking the belts from pulleys so as to avoid the running of other machinery or arranging loose pulleys.

We work along the individual motor system as closely as possible, except where one motor will handle two or more machines.

CAPITAL CITY BOX COMPANY, LTD.,
Edmonton, Alta.

* * *

Well-finished Products With Electric Drive.

We have a total of 15 motors at our mill, each piece of machinery having an individual drive. Our products are known by their finish, same being of the highest order, and we believe the credit is largely due to electric drive, for our machines are always running at top speed, regardless of material we may be working.

With the individual drive and direct connection, overhead pulleys, belts, and tighteners are entirely done away with, thus assuring light and safety to the operators of machines. When we started this mill it was the writer's first experience in an electric-driven plant. The time we have lost on meter trouble is scarcely worthy of note. We found it necessary to replace one fuse, and have not burned a motor during three years' operations.

We have not found it necessary to keep an electrician, each operator taking care of his own machine and motor. A millwright, a busy man in a line-shaft mill, would find very little to do in a mill like ours. An oiler is a thing of the past.

IOWA LUMBER AND TIMBER CO., LTD.,
Vancouver, B.C.; F. C. Shaw, Supt.

Electricity Power Rates

The rates for electricity for power purposes vary greatly throughout Canada, but we doubt whether there is any place at which they can be considered prohibitive in comparison with the power of generating steam. The cost of making electricity depends upon a number of factors, one of the most important of which is the cost of coal, plus freight rates, etc. (unless water power is available). It will be easily understood that this same factor—coal—has to be considered by a woodworking plant operating by steam power. Therefore, the rate for electric power in a particular location, while it may appear considerably higher than the rates prevailing elsewhere, will nevertheless generally be found to be in a ratio with what it would cost the user to make his own steam power in that same location. The difference in rates throughout the country can thus be more readily appreciated.

Starting with the Maritime Provinces, the rates for some of the leading towns or known woodworking centres are given below.

Nova Scotia

Electric current for power purposes is sold in Halifax by the Nova Scotia Tramways and Power Company, Ltd., at the rate of 8c per kw. hour. The following discounts are allowed to customers paying their bills promptly: To customers supplied under a contract for any period less than five years, when the consumption is less than 1,250 kw. hours in any month, 25 per cent discount; to customers supplied under a contract for any period less than five years, when the consumption exceeds 1,250 kw. hours in any month, the discount is 37½ per cent.; to customers supplied under a contract for five years, where the consumption is less than 1,250 kw. hours in any month, the discount is 50 per cent.; to customers supplied under a contract for five years, when the consumption exceeds 1,250 kw. hours in a month, for that month a discount of 55 per cent. is allowed. The minimum monthly charge is $2.66.

The power rate charged by the Canada Electric Company, Ltd., at Amherst is a fixed charge of $12 per year per horse power of maximum demand, plus 2c per horse power per hour as metered. Cheaper rates, regulated by special conditions, are allowed for larger consumers.

New Brunswick

In Fredericton the base rate for power is 10c per kw. hour, with a progressive scale of discounts for

quantity used. The discounts depend to some extent on the possible demand for power as well as on the actual amount used. Each power customer is given a certain "maximum demand" rating. This is the usual maximum power used in the operation of his motors. A rental charge of 50c per month is made for use of meter. On all bills paid before the 10th of the month a cash discount is allowed. The Fredericton Gas Light Company, who supply the current, state that they have one customer out of 18 or 20 power users who is paying them a net price of 2.7c per kw. hour, while other customers are paying somewhat higher prices, depending on the quantity of current they use in proportion to their connected load.

Quebec

Coming to the Province of Quebec the power rates charged by the Quebec Railway, Light, Heat, and Power Company in Quebec City are as follows:

Flat rate.	Per annum.
¼ h.p.	$25.00
½ h.p.	40.00
1 h.p.	60.00
	Per h.p. per annum.
2 h.p.	55.50
3 h.p.	50.00
5 h.p.	45.00
7 h.p.	42.50
10 h.p.	40.00
15 h.p.	38.00
20 h.p.	37.50
25 h.p.	35.00
30 h.p. and upwards	30.00

Meter rates:

Under 200 kw. hours per month, 3c.

For 200 to 400 hours per month, 200 kw. at 3c per kw; excess, 200 kw. at 2.75c per kw.

For 400 to 600 hours per month, 400 kw. at 2.75c per kw.; excess, 200 kw. at 2.3c per kd.

For 600 to 1,000 hours per month, 600 kw. at 2.3c per kw.; excess, 400 kw. at 2c per kw.

For 1,000 to 2,000 hours per month, 1,000 kw. at 2c per kw.; excess, 1,000 kw. at 1.5c per kw.

For 2,000 to 3,000 hours per month, 2,000 kw. at 1.5c per kw.; excess, 1,000 kw. at 1.2c per kw.

For 3,000 to 5,000 hours per month, 3,000 kw. at 1.2c per kw.; excess, 2,000 kw. at 1c per kw.

For 5,000 hours per month, 5,000 kw. at 1c per kw.; excess, .08c per kw.

Ontario

In a large majority of the municipalities in Ontario the power is distributed by the Hydro-Electric Power Commission at rates varying from 1.5c per kw. hour to 5.4c per kw. hour for the first 50 hours used. Only about a fifth of the municipalities have a rate over 3c per kw. hour. Service rates are charged by the Hydro-Electric Power Commission, varying slightly in different municipalities.

At North Bay, Ont., a standby charge of $1 per horse power per month is made on the installed capacity or maximum demand. The consumption charge is 3c for the first 50 hours used of installed capacity, 2c for second 50 hours used, and 3/10c for all additional consumption.

At Oshawa, Ont., a service rate of 90c per month per horse power of connected load is charged. The consumption rates are: First 50 hours monthly use of load, 2.1c per kw. hour; additional consumption up to second 50 hours used, 1.4c per kw. hour; remaining consumption, 15c per kw. hour. These rates are subject to class discounts for restricted and unrestricted hours of use.

Power rates charged by central stations in Ontario not controlled by the Hydro Power Commission vary. Owen Sound, Ont., which is a woodworking and furniture town, has a rate of 3½c per kw. hour for first 50 hours' use; second 50 hours' use, 2 3/10c per kw. hour; over this, 3/10c per kw. hour. A service charge of $1 per month per horse power on the installed capacity is levied, together with a meter rate. Class discounts are made for unrestricted and restricted hours; also a discount for prompt payment.

Manitoba

Going west to Winnipeg, we find the favorable rate of 3 1/3c per kw. hour for the first 50 hours' use, reducing to a rate of 8c when the period of use has exceeded 250 hours. To this there is added a minimum monthly payment of 75c per horse power of total connected load. Discounts are allowed for prompt payment, varying with the number of years for which power is contracted.

Saskatchewan

At Regina a base or service charge is made of 50c per month per horse power of connected load. The consumption rate is 5c per kw. hour for the first 20 hours, gradually reducing until a rate of 2.5c per kw. hour is obtained, when the amount has reached 900 kw. hours. Special concessions are made to large users; also a discount to all consumers for prompt payment. The average monthly bill of one woodworking factory in Regina, with an installation of 52 h.p., is $62.03. For another firm using 20 h.p. the average monthly bill is $34.92.

The power rates at Saskatoon, Sask., are: First 750 kw. hours, 5.4c; the next 2,250 kw. hours, 2.34c; and for the balance, 2c.

Alberta

The consumption rate at Edmonton is 3c per kw. hour for the first 150 kw. hours, gradually reducing until at 5,001 kw. hours a rate is obtained of 1.2c. For all power used above 2,501 kw. hours there is a rate of 1c net. A minimum charge is made of 25 kw. hours per horse power connected, per month. A discount of 10 per cent. is allowed on all power except that which is sold at 1c net.

British Columbia

The British Columbia Electric Railway Company, Ltd., who supply electric energy in Vancouver, have recently issued a new schedule of rates for consumers having active loads of from 100 to 1,000 horse power. For consumers classed under this schedule the rate is 2c per kw. hour, reducing to a rate of .5c when the consumption exceeds 130 kw. hours. Discounts ranging from 5 per cent. to 15 per cent. are allowed, according to the amount of horse power used. The minimum monthly charge is fixed at $1 per horse power of active load.

Example of Bill

For a factory operating 10 hours per day and running 100 active h.p., or maximum demand of 100 h.p., and averaging 65 h.p., would use 1,2000 kw. hours per 24-day month.

First 6,500 kw. hours cost 2c per kw. h. =	$130.00
Next 5,500 kw. hours at .75c per kw. h. =	41.25
	$171.25

Average price per kw. h., 1.43c.

It will be seen that at no place throughout the Dominion are the rates for electric power unfavorable to the manufacturer considering the installation of electric motors.

Electrifying the Surfacer, Three Drum Sander and Mortiser

By E. C. S.

The low-priced electrical current available in most localities in Canada makes the subject of motor drives for woodworking machinery of particular interest to all furniture manufacturers and operators of woodworking plants. Closely related to the subject of motor drives is the modern method of self-guarding the machine. The individual motor-driven machine lends itself particularly well to thorough safeguarding, both electrically and mechanically.

Herewith are presented illustrations of machines of particularly common use in the furniture and woodworking trade, fitted up in this modern way.

Fig. 1 shows a single cylinder surfacer with motor direct coupled to the cylinder with a flexible insulated coupling. The motor is mounted on a pedestal, which forms part of the machine itself. The steel enclosed line cut-off switch is mounted on this pedestal, and a starting compensator is mounted on a floor stand. Electrical and mechanical control is right under the operator's hand, without moving from his position. All gears are fitted with iron covers and the belts with wire mesh guards.

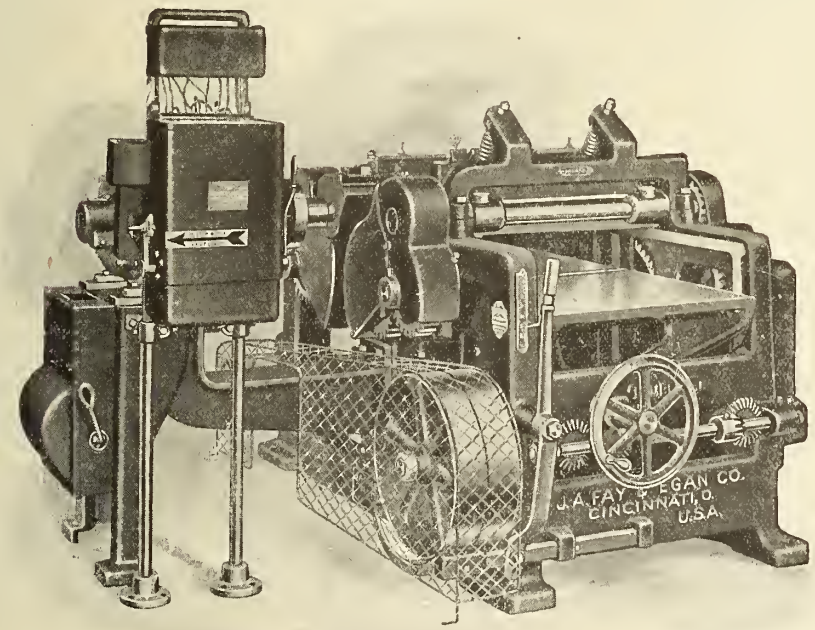


Fig. 1—Single cylinder surfacer with 3600 R.P.M. Motor direct coupled to cylinder.

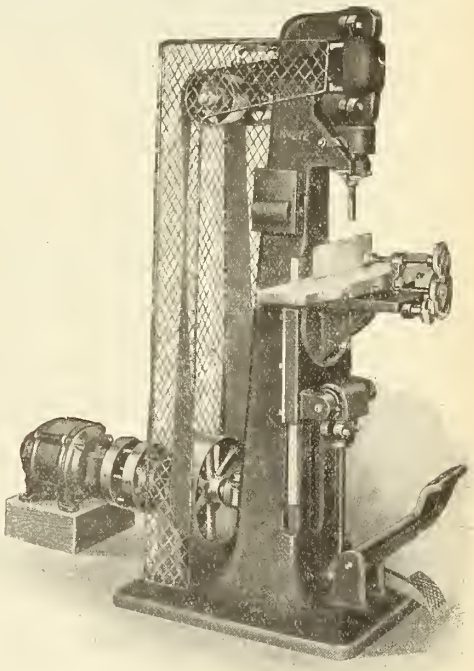


Fig. 2—Hollow chisel mortiser with motor direct coupled to driving shaft.

Fig. 2 shows a hollow chisel mortiser with motor direct coupled to driving shaft by means of flexible insulated coupling, belt guarded and a steel enclosed starting switch.

The three-drum sander presented one of the hardest problems to solve in the development of direct connected individual motor drive.

For the 48-inch machine four motors were used, two of 7½ h.p. and one 5 h.p., all at 1,800 r.p.m., mounted on a stand, the two 7½ h.p. motors driving the first and second drums at 1,300 r.p.m., the 5 h.p. driving the third or finishing drum at 1,800 r.p.m., and a 3 h.p. 1,800 r.p.m. motor geared to feed drive shaft. Total available h.p. for intermittent heavy load 35. A substantial but neat appearing iron stand of the proper height was placed at the side of the machine to support the motors driving the drums.

The drums not only had to be revolved, but oscillation or constant side motion had to be provided, and this was taken care of by the cut steel and rawhide gear connection between motor and drum. This drive eliminates all belts except the small one for the power hoist. From his position at the infeed end the operator by throwing a switch stops and starts any or all drums or the feed. There is no heavy starting torque, no lost motion or wasted power in this self-contained installation.

The use of the individual motor drive machines is changing not only the appearance, but the system of production in many factories. In place of a forest of overhead shafting and belting the space above the machine is now free for the admission of light and air in large quantities. No longer is it necessary to put all machines in a straight line. They can now be placed wherever they best fit into the scheme of production, with the consequent great increase in efficiency throughout the organization where these modern units are used.

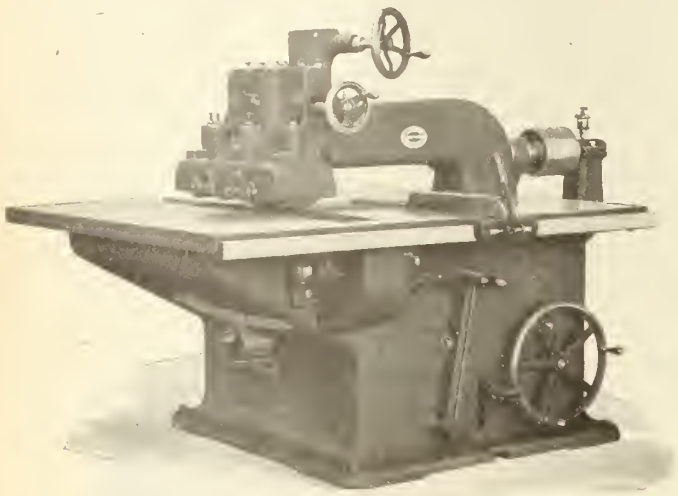
Reynolds Machine Mfg. Co. Succeeds Reynolds Pattern & Machine Co.

The Reynolds Machine Manufacturing Company, of Massillon, Ohio, recently incorporated with capital of $200,000, will take over the plant now being operated by the Reynolds Pattern and Machine Company, of Moline, Ill., and will move the plant to Massillon as soon as a site is selected and buildings erected. Mr. Geo. D. Reynolds, who is at present general manager of the Moline plant, has been elected a member of the board of directors of the new company and will continue in the capacity of general manager.

The man who will not undertake a task unless he can see immediate profitable results coming from it will never undertake anything that is worth while.

The New Mattison Ripper

The accompanying cuts illustrate the latest development in chain-feed ripping and edging saws. This tool was recently placed on the market by the C.



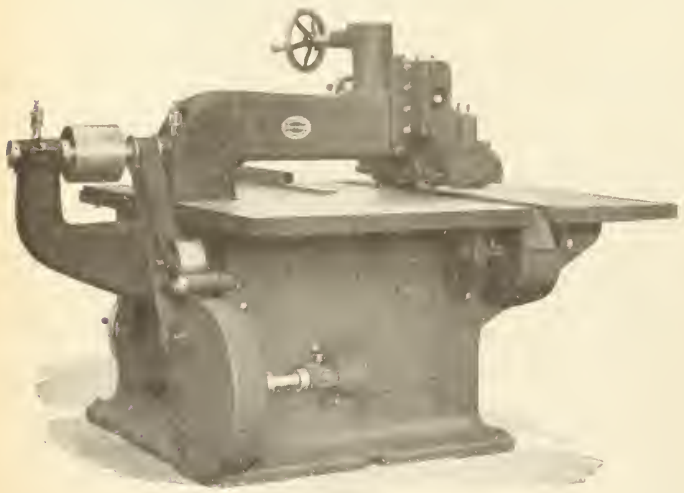
Front view of new Mattison Ripping and Edging Saw.

Mattison Machine Works, Beloit, Wisconsin, the well-known builders of Mattison lathes, belt-sanders, and other labor-saving specialties.

The design and construction embodied in this saw is the result of the combined experiences of hundreds of practical men who have operated and had charge of similar saws heretofore placed on the market. All of these saws had some very good features, but they also had their disadvantages and weaknesses. The aim of the Mattison Company in bringing out their new saw was to eliminate the weaknesses and drawbacks of the average saw then on the market, and build a tool embodying the practical features and advantages which the experiences of practical users of this type of machine had demonstrated as valuable and essential.

That they have successfully accomplished what they set out to do is evidenced by the hearty endorsement given their new rip-saw by superintendents who have had an opportunity to inspect the machine.

While space does not permit of a complete description of the practical details of construction and operation of this machine, any practical man can readily



Rear view of same machine.

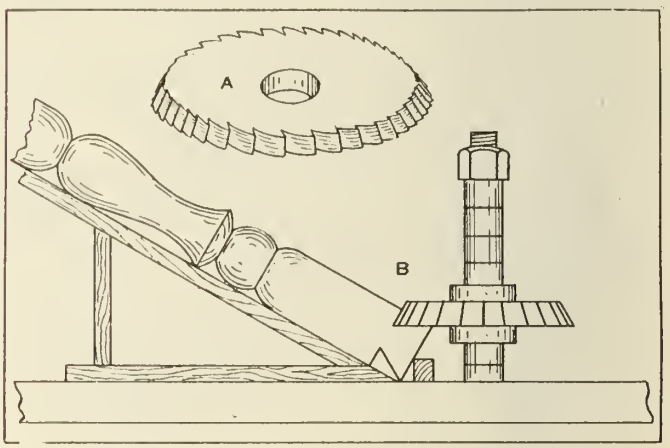
see by looking at the pictures what a thoroughly designed, well-proportioned, compact and business-like appearing tool it is, characteristic of the entire Mattison line of woodworking machinery. Descriptive matter can be obtained by writing the Mattison Machine Works, 883 Fifth Street, Beloit, Wisconsin.

It is pleasing to note new developments in machinery of this kind, especially now, as every factory is confronted with the extreme scarcity of labor. The problem is not a simple one to solve. Prices may be raised to offset in a measure the higher cost of labor, but that does not help the shortage. The big thing is conservation. Make each man more productive, and strive for methods which will make two or three men produce as much as five or six did before. It is developments and improvements in machinery of this kind that are gradually solving this labor problem; and any factory that doesn't take advantage of the new offerings in labor-saving machinery is surely not looking to the future of its business.

Dovetailing Balusters on the Shaper

Here is a simple and easy way to dovetail balusters on the shaper; it is much easier than on the band saw. In band sawing the balusters are handled twice, while on the shaper they are handled only once, and the cut is more accurate.

The saw that makes the cut is shown at A; it is ½ in. thick, 4 in. in diameter, with teeth ground on a bevel. To bevel the saw put it on shaper mandrel, put



Showing how balusters are dovetailed on shaper.

up a guide, and let it cut through guide about ½ in., place a piece of old emery wheel against saw, and grind it off on a bevel, then take a file and file the teeth sharp, and it is ready to use.

Make a form as shown at B, to put the balusters on. This form slides against a small strip which is tacked on the table. Set the form on an angle so that bottom of saw cuts the dovetail parallel with table and the bevel on saw makes the square part of the cut. The sketch shows only the sectional view of form; there is a piece on the back that extends up to top edge of form and down to bottom end of the baluster. This is put on to keep the wood from tearing when the saw passes through, and at the bottom end of this piece there is a stop that the baluster sets against.

This saw makes a very smooth cut, and does not tear out as much as a pair of cutters would; at the same time it is easier to push the baluster through.—H. C. S., in "The Woodworker" (Indianapolis).

The success of many men in business has not been solely due to their shrewdness, but to their ability to correctly read human nature and surround themselves with efficient and reliable help.

The Lumber Market

Domestic Woods

There is very little change in the lumber situation from a month ago, except that prices have been stiffening somewhat. The general price list does not show much change, only that the common grades of white pine have advanced from $1 to $3 per thousand during the past month.

Reports from the logging sections of the country are still to the effect that the output during the present winter has been greatly curtailed owing to the fact that weather conditions have not been entirely favorable, very heavy snowfalls having made bush operations difficult. This situation, together with the reduction in the number of camps, is expected to have a serious effect upon the quantities of stocks available next season. And, as these stocks have been taken out under unfavorable conditions, higher prices will undoubtedly prevail during the summer and fall of 1917.

It is estimated that in some districts logging operations are costing from $2 to $2.50 per thousand feet more than was anticipated last fall. Shell box manufacturers in Ontario and Quebec are paying high prices for any stocks they can get hold of. Under their contracts, they are obliged to make deliveries at specified periods, and they must have lumber. All these things are affecting prices, and it seems as though manufacturers have nothing to look forward to but increases.

The recent order of the British Government prohibiting imports of lumber into the British Isles, except under special license, may tend to create a little better situation in Canada in regard to stocks, but not sufficient to give much relief.

The following prices are those prevailing at Toronto for car lots: White ash, firsts and seconds, 1½ and 2 inch, $60; birch, firsts and seconds, inch, $44; basswood, firsts and seconds, inch, $48; soft elm, firsts and seconds, inch, $40; rock elm, first and seconds, 1½ and 2 inch, $55; soft maple, firsts and seconds, inch, $33; hard maple, firsts and seconds, inch, $40; Douglas fir, No. 1 and 2, 1 inch, clear, $44.50.

Imported Woods

Embargoes and car shortages are about all there is to talk about in connection with the lumber market in the United States. The situation is not quite so bad now as it was, but there is still very great room for improvement. Southern shippers have been holding oak, gum, and cottonwood at firm prices, and this has been a marked feature of the situation. It is safe to say that oak has gained its old form as a leader among hardwoods.

The keynote of the lumber situation is that sales are easily made and deliveries difficult to make. This, of course, makes prices remain firm on all grades. Red gum is still holding a very prominent place in the hardwood list and is constantly gaining in prestige. There is a scarcity of gum at the mills, though, as a number of them were obliged to shut down owing to unfavorable weather conditions. This has further prevented the shipping of orders.

One of the woods most in demand at present is maple. Ash, also, is in good call by the automobile manufacturers, as well as elm and eight-quarter and thicker maple. Poplar still holds its own, and birch and basswood are being bought regularly where available. A feature of the hardwood situation in the United States is the quantity that is being purchased by box manufacturers, prices being thereby sustained.

In the Northern hardwood-producing districts of the United States the winter cut of logs is expected to fall below the estimate made during the early part of the winter, and, of course, this means smaller stocks for sale this summer. Jobbers of hardwood lumber say that they have practically all the business they can accept under present conditions, and that their worry comes from the fact that they are unable to make any perceptible headway in their efforts to reduce the amount of unshipped orders on their books. Stocks are scarce, and this, together with the shortage of cars and embargoes, renders it difficult to make shipments. Manufacturers apparently appreciate the conditions and accept them philosophically. Very few cancellations of orders are heard of. Undoubtedly the party cancelling would be the loser, as there is no difficulty in disposing of stocks.

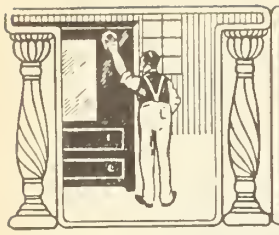
Such items as six-quarter and eight-quarter No. 1 common and better birch and the same items in maple are very difficult to secure in dry stock and in any quantity. Basswood has been made such general use of in factory lines that the stock that looked big last fall has been reduced to a point of absolute scarcity in items of many descriptions. It is predicted that the entire cut of last year will be well sold out before any new cut stock is ready for shipment. Low-grade basswood has been entirely cleaned up, as there has been a lot of this material used by box manufacturers, and they are continually in the market for anything that is suitable for their purpose. The box makers are also taking a lot of No. 3 maple, and prices are strong on this item.

To sum up: Stocks are low, prices are firm, and the embargoes and shortage of cars make shipments difficult. Current quotations at Boston are: Basswood, $45 to $47; maple, $47 to $49; plain oak, $65 to $67; quartered oak, $88 to $91; sap birch, $58 to $60; white ash, $58 to $61. It is stated on authority that buyers have paid without protest $60 for firsts and seconds grade sap birch in inch stock, $67 for plain oak, and $49 for maple. The best yellow poplar in inch stock has sold at $65. The lowest quotation on inch poplar firsts and seconds is $62.

Kiln-Drying Hemlock

In the course of co-operative experiments which are being conducted at the Forest Products Laboratory at Madison, Wis., by the Northern Hemlock and Hardwood Manufacturers' Association, a rapid method of kiln-drying eastern hemlock has been developed whereby shiplap can be dried green from the saw to shipping weight in forty-eight hours and the two-inch plank in six to eight days. One carload of shiplap and two-inch stock of various widths has already been dried in the course of the experiments. All of the material came from the kiln in excellent condition, and there was practically no loss due to drying. As a result of the demonstration a large lumber company is now planning the erection of kilns to operate by this method, and it is expected that other plants operating in hemlock will also adopt it.

The man who handles his belt-shifter or his clutch lever with care and gentleness is not likely to abuse his machine.



THE FINISHING ROOM

Gilding and Applying Gold Leaf

By Chas. W. Inglis

There are two kinds of gilding practiced by the trade, one being called "oil gilding," the other "water gilding," and the latter is subdivided into what is known as matt and burnish.

Suites of furniture in white and gold look chaste when the surrounding colors harmonize. Judgment must be used in deciding what parts of the article should be white, matt, and burnished. Brackets, whatnots, console tables, chairs, lounges and many other articles of furniture are ordered in white and gold. Gilding is also practiced on interior decorations for buildings, church furniture, pipe organs, railway coaches and steamboat cabins.

The first essential is to have a good smooth foundation. The article to be gilded should be coated with varnish or enamel, or else it should receive two coats of size. The majority of the work is enameled. As enameling was explained in the October issue of the "Canadian Woodworker and Furniture Manufacturer," it is not necessary to describe the process now. Taking a piece of furniture after it has been enameled, the parts to be gilded should first be sandpapered with very fine paper and then thoroughly dusted. The edges should then be gone over with a pounce (bag made of cheesecloth filled with whitening) to keep the gold from sticking in places where it is not intended to stick. Another method is to mix whiting in water and apply with a soft brush. When the water has dried, dust off the superfluous whiting with an ordinary painter's duster. The article is then ready for the size.

Every finisher should make his own size, then if it drys too quickly or too slowly he will know what is required to make it right. This is a very important part of the work, for without a good size, good work cannot be done. A good size is made as follows: Put boiled oil in a stone pot, place the pot on a slow fire and let the contents rise to such a heat as nearly to ignite. Then with a match or lighted paper set fire to it. Let it burn for a few minutes so as to thicken, then cover the pot with a piece of cloth to put out the flames. The contents will now be like a syrup and should be strained through silk or some closely woven cloth. Bottle it and it is then ready for use, except that it may need a little thinning out with turpentine.

A quick drying size is made by taking some quick drying copal varnish and adding to it some old boiled drying oil, just enough to give it tack.

The best size known is made in the following way: Take a pound of the best drying oil, put it in an iron pot with a cover, over a slow fire, and after it has almost come to the boiling point add four ounces of pure gum animi (not copal; some dealers have the idea that animi and copal are the same thing, but such is not the case). Have the animi reduced to a fine powder; put it on the point of a pallet knife and sift in cautiously a little at a time. Allow time for it to dissolve, stirring the mixture all the time; boil to consistency of tar, and while warm, strain it through a piece of silk into a heated wide-mouthed bottle. Keep well corked and use as required. This may be thinned a little with turpentine, but care should be taken not to get it too thin or it may run.

This is the "Secret Size" used by leading artists in London and Paris, and will gild on glass, china, metal and almost everything else if properly made. It is also used by the celebrated japanners of Birmingham. In making size it is advisable to use some color ground in oil, such as yellow ochre, chrome yellow, or red lead. By so doing it is easier to see what you are doing, besides making a better background for the gold. A slow-drying size should be used wherever possible, as it gives a much better lustre than the quick-drying size. The common practice is to size in the afternoon for gilding the next day. The size should be applied as thinly and evenly as possible, keeping the edges smooth and clean. Ox hair makes a good brush, and a brush made of half sable and half camel hair makes an excellent tool also.

To apply the gold leaf take a piece of rubber packing one-sixteenth of an inch thick, cut it the same size as the gold in the gold leaf book and put it between the pages. Then turn down the first page in the book the required size of gold leaf wanted. Cut the gold leaf by running the finger nail along the edge of the fold in the page. If the work being gilded is stripes, bevels or coves, the gold can be applied right from the book. The rubber packing keeps the book firm, and at the same time it is pliable enough to enter a cove moulding.

If any little spots have been missed this is the proper time to patch them up. It will be found that the gold is all ragged and that in many places there are two and three thicknesses. The work should be carefully padded or pressed with a dabber or wad of cotton, and then skewed well in with a bear hair fitch. The skewings are small particles of gold. After wiping the dry whiting off the edges of the work with a clean cloth it will be complete.

Many gilders finish their oil gilding by giving a coat of varnish. The writer is not in favor of this. The bare gold, if good and on a good size, will stand better, change less, retain its lustre longer with less liability to dulce or crack, than when varnished. Where the gilding is liable to be handled, however, a thin coat of copal varnish or a thin coat of clear oil size will add to the durability. The subject of water gilding will be dealt with in another issue of the "Canadian Woodworker and Furniture Manufacturer."

It's a long and hard pull up to a good reputation, but the fall down to a poor one is both easy and rapid.

"PEACE HATH HER VICTORIES NO LESS RENOWNED THAN WAR"

The demand for MARIETTA FINISHES is the result of such a victory

It proves that we have achieved something of recognized value to the furniture and piano manufacturers of America.

The thing is simple. We have combined the scientific with the practical.

We know how to use the stains we make, and how to tell others to use them.

Many of our stains are the result of actual experience in wood finishing.

Write for sample panels

The MARIETTA PAINT & COLOR Co. Marietta, Ohio

Pin Holes in Varnished Work

During a recent conversation, the superintendent of a large woodworking plant manufacturing products calling for a high grade finish, told the writer that his firm, from time to time, experienced more or less difficulty with pin holes showing up in their varnished work when it reached the rubbing room. He stated that he would like to see the subject discussed in these columns. We, therefore, invited a number of our readers to submit their views for publication. Some of their replies are published below. We will be glad to receive communications from other practical men who have found a remedy for pin-holing.—Editor.

* * *

Pin holes are the result generally of insufficient filling of the wood. This is a common complaint on birch tops, and is due to the use of very light bodied filler, the wood thus being not properly filled.

The staining should be done first, using a water stain, and allowed to dry thoroughly. If the tops have not already been sponged in the cabinet room, to swell the grain, have that operation done first. The application of the stain will raise the grain a very little, and this must be sanded perfectly smooth before the application of the filler. Rub the filler well into the wood and give plenty of time to dry—at least 24 hours—before applying shellac.

In finishing mahogany it is well to apply a very thin shellac wash before the filler. The reason pin holes appear is that the little air pockets in the more open parts of the wood are simply crusted over, and in shrinking down the air as an actual consequence forces its way out, which causes the so-called pin holes. These are caused in the finishing of oak by putting on the filler before the mixture in the stain is thoroughly evaporated, which in time produces a somewhat similar result.—W. J. Beattie, Owen Sound, Ont.

* * *

Before suggesting a remedy for pin holes in varnished work, it is necessary to get at the cause of the trouble, and from experience we should judge that there is a certain amount of mixture in the water or in the filler used, which shows up on the surface after the varnish has been rubbed. This might be overcome by using a very slow drying and flowing varnish. The explanation of this is that the mixture would break through the varnish before a film is formed, and being slow drying, the varnish would flow and fill up the pin holes, and in the meantime the mixture would have evaporated.—The Canada Paint Company, Limited, Montreal, Que.

* * *

Re pitting and pin holing of varnish, the varnishing should be done in an even temperature of not less than sixty degrees. The article to be varnished and the varnish used should be as near as possible of even temperature. Varnishing over damp or sweaty surfaces will cause the trouble mentioned. The action of ammonia will also produce it. Care should be exercised in pouring out the varnish. It should be carefully run out of the can down the inside of the varnish pot, instead of being poured into the centre. This keeps the varnish from becoming full of air. After being poured the varnish should stand at least an hour before being applied to the work.

The mixing of varnish is another source of trouble. Tampering with it by adding dryers or turpentine will often cause it to pit or pin hole. A good varnish from a reliable maker, used under the conditions mentioned above, should produce good results. Varnishes produced by reliable makers are carefully made and treated before being placed on the market, and are intended to be used without being diluted.—James Culverwell, Toronto, Ont.

* * *

Pin holes in varnished work are caused in so many different ways that it would be almost impossible to treat the subject intelligently without making a great number of experiments and practical tests.

Our suggestions are as follows: If the pin holes appear when finishing oak, it is due to faulty filler. Filler used does not harden up sufficient to protect shrinkage of varnish, or else it is too soft and when the rubbing is done the rubbing cloth pulls varnish away from the portion of surface which has been filled with the poor quality of filler, and which does not dry hard enough to allow the varnish to harden sufficiently to be rubbed.

The same trouble occurs when using very high class rubbing varnish and not allowing sufficient time for it to become thoroughly hard. If the varnish has not been sufficiently hardened, the rubbing cloth will surely pick out very small pits here and there, which look very bad and give no end of trouble to level up before the job is completed.

If the manufacturer who is in trouble desires concrete information, we would advise that he place his trouble before some competent house, stating just what quality of varnish he uses, the process with which it is used, spraying, brushing, etc., time allowed for drying between coats, and other information. Then the subject could be dealt with in a more intelligent way.—Ottawa Paint Works, Limited, Ottawa, Ont.

* * *

"Pin holing" in varnish work may be due to the varnish being too new or "green," or to the condition of the under coats. We do not think that much "green" varnish is shipped out to-day, as most varnish makers are careful to age their material properly. Where the ground work is not properly filled pin holing will naturally always appear. This may be due to a poor class of filler or to carelessness in applying the material. Very often shellac is thinned down to such an extent that it cannot properly fill pores, and as a consequence the following coats of varnish sink in and pin hole. Liquid fillers are frequently not properly made and give the same results as above.

When a full bodied shellac is properly applied and thoroughly sandpapered there should be no trouble. Good results should also be obtained when the correct grade of liquid filler is used. The best liquid filler should be made with a fair grade of furniture varnish, finely ground or floated silex and a little turpentine. A small amount of japan may be used to hasten the drying. Cornstarch is too frequently used to excess in these fillers and "picks out" when the work is rubbed or sandpapered. The result of this "picking out" is "pin holing." There seems to be an impression amongst the ordinary trade that silex and silica are two different things. They are, of course, identical in composition.—H. V., Montreal, Que.

* * *

Concerning pin holes, I think the fault will be found in the filling. Work that has been filled with an oily or

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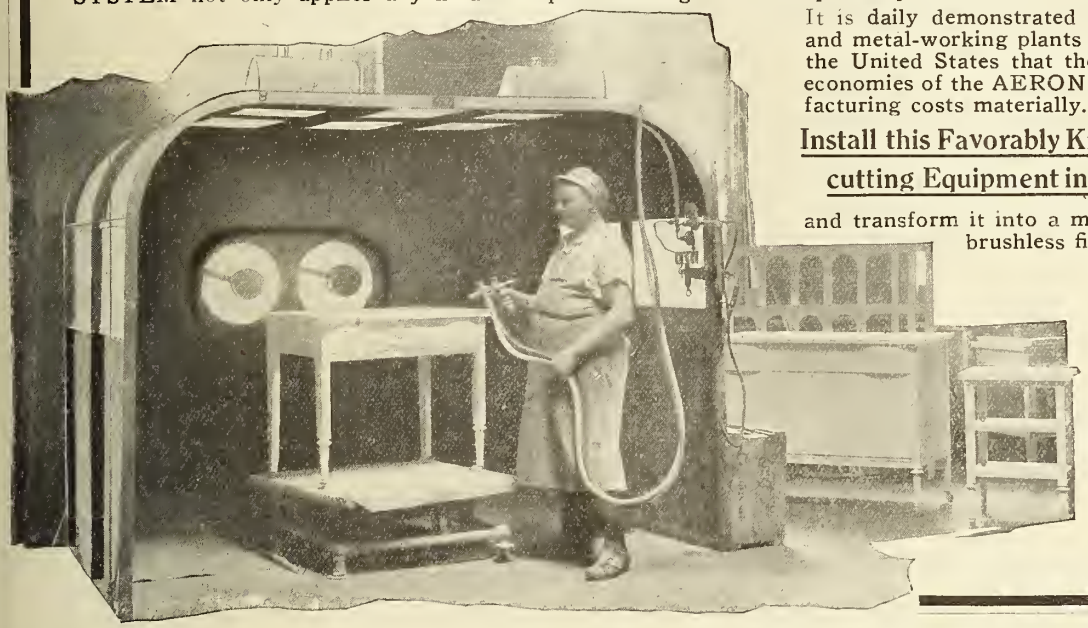

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slow-drying filler is apt to cause this trouble. If it has been shellaced and varnished before the filler is thoroughly dry, the air cannot come in contact with the filler. Then the only way the filler has a chance to dry is for the oil to be absorbed in the wood, causing shrinkage in the filler, making space which no doubt fills with gas.

For a high grade finish, a filler should be made so that it will dry as hard as the wood itself. It should be applied the consistency of thick cream, and thoroughly rubbed in. It should not be shellaced inside of forty-eight hours. By following these directions I am sure the trouble will disappear.—C. W. Inglis, Dundas, Ont.

Decorating Furniture by New Process

There is no question but that this country is entering on an age of decoration in furniture, which threatens to surpass in elaborateness and duration any other period in the history of American furniture, says S. Webster Stone, writing in the "Furniture Manufacturer and Artisan." The age of prosperity has invaded the furniture factory, and we find all over the country large and small factories manufacturing decorated furniture; in fact, almost without exception every factory is showing at least one suite in decoration.

Probably the most elaborate form of decoration is seen in the Chinese and Japanese. Bed rooms and dining room suites in the periods of Queen Anne, William and Mary, and Chinese Chippendale are shown decorated in very attractive creations. We find that Adam suites decorated in conventional floral and Pergolesi designs are also very popular, while furniture of other periods is being attractively decorated in straight floral designs.

This great demand for decorated furniture presented a serious problem to the manufacturer as to how he should get out this volume of business. The supply of available artists was far short of the necessary number to produce the furniture demanded, and it looked for some time as if manufacturers would have to limit the amount of decorative furniture they were to deliver to a very small part of what they could sell.

About this time there was discovered and patented by a Chicago man a process of reproducing hand paintings faithfully and accurately in form of an oil decalcomania. This decalcomania is very different from the old style of transfer manufactured for years by American and foreign houses. In the first place, the work is done by photographic process. An original painting is made from which all the colors are separated by photography. Color plates are made from these separations and are printed in genuine oils. The relief and built-up effects are produced by printing the same color over and over again, one on top of the other until a regular body of oil has been amassed, which in reality is exactly what occurs in the operation of painting by hand. Long experimenting has brought this to such a degree of perfection that we find the most elaborate decorations reproduced so faithfully that the artists themselves are unable to distinguish the reproductions from the originals.

This process certainly has been the salvation of decorated furniture. It has made possible the putting of the most elaborate decorations on furniture which could never have been done by hand work owing to the great expense attached thereto and the scarcity of the skilled labor to produce them.

The process is sure to keep decorated furniture in vogue much longer than by the old slow hand method. Nothing will kill art like an overproduction of poor efforts. No artist can do the twenty-fifth reproduction of the same design as well as the first two or three; whereas these new oil decorations adopted by all the large furniture manufacturers of the country, providing their originals are right, will all come out with the same degree of perfection whether the manufacturer decorates one suite or a thousand.

Finally, we believe this process of reproduction means even more to the layman in medium circumstances than to the manufacturer of decorated furniture, because it is making possible for him to purchase medium priced furniture with high-grade decorations, something that he has long had a desire to do, but not the means to finance.

This is what Shakespeare says of "beauty":

"It may be but a vain and doubtful good,
A shining gloss that fadeth suddenly."

Which would indicate that the wise William had some practical knowledge of varnish!

The man who just handles his job half-heartedly, who won't give even ten minutes a day for gaining more knowledge than he needs for his daily work, will never stand in the arena with the winners. There is no "roval road" to power except "plugging."

The man who goes ahead and does things and says but little about it is worth two of the man who is always bragging about what he can do, or what somebody else has done, that is superior to what is being done around him at the present time.

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Veneers and Panels

Electricity in the Glue Room

By R. Newbecker

In equipping a veneer room at the present day the thoughtful purchaser realizes more than ever the importance of getting equipment that will produce high-grade work with the least possible expense and at the same time occupy the minimum of space. Electric glue heaters for veneering purposes are fast superseding the present gas or steam-heated type, and, in the writer's opinion, they are far superior and more economical of operation than the gas or steam ones ever can be.

Enough can be saved by operating an electric glue heater to pay the higher first cost in a very short time. Then, also, the danger of overheating glue is reduced to a minimum, if not totally obviated. Another advantage is that less floor space is required and a lot of piping can be done away with.

Some factories that have their own steam manufacturing equipment may raise an objection to the cost of heating glue with electricity, saying that when they have steam anyway it is cheaper to use it than to buy electricity. In a great many cases they are mistaken, as electric current can be purchased almost anywhere to-day at from 2 to 6 cents per kw.h., and at these prices it is cheaper to use it as the heating agent. Dissolving glue by steam is wasteful, as three-quarters of the heat is radiated into the room from the pipes. While this extra heat often does not come amiss in the winter, it makes the glue room a disagreeably hot place to work in in the summer. Then, again, with steam there is always present the danger of overheating or burning the life out of the glue. At the present market price glue is too expensive to be wasted.

There are two types of electric glue heaters on the market—one is made with a heat-retaining jacket and the other without. Of these two types the former is the more economical as regards the using of current. All the current generated is retained in the heater and in the glue; there is practically no radiation, and there is no surplus of heat or current used. With this type of heater in use the glue can be melted and kept hot all day long with one hour's use of current.

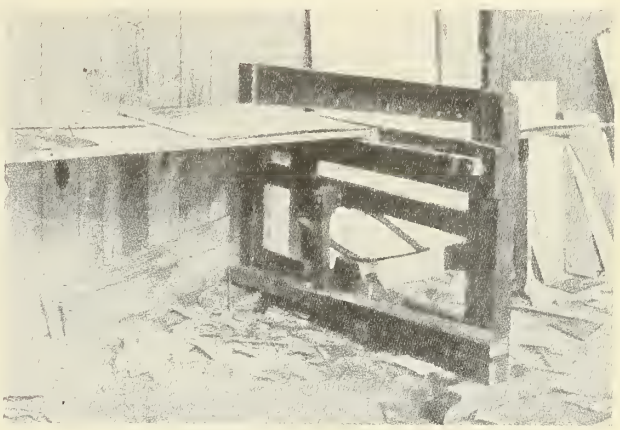
Some of the electric glue heaters on the market that have heat-retaining jackets are provided with a special heating device instead of the electrical coil so generally employed for this purpose. This device consists of a heating unit which is entirely separate and distinct from the heater. Cold water in this case flows from the bottom of glue heater to the electric heating units, which are encased in the regular connecting pipe leading from bottom of heater and entering, a little above half-way up, into the heat-retaining jacket. The water is thus heated, forming a vapor; then it rises up in the tubes or pipes, and passes into the outer jacket of the heater. By this method the glue is dissolved by the vapor arising from the heated water and coming in contact with the receptacle containing the soaked glue.

Considering the question of glue heaters from all points of view, while the steam-heated type gives fairly satisfactory results, the electrically-heated ones are much better. It costs very little to place an electric glue heater in any shop, and the comfort it affords the men in doing gluing work in an agreeable atmosphere in summer, instead of in an overheated sweatbox, makes it a good investment. Then, also, the saving of fuel through less steam being required is worth considering.

Ingenious Veneer Cutter

No, this isn't a guillotine, used to slice off the heads of aristocrats, but is simply a picture of a home-made veneer cutter found in a shop in Indiana, which for simplicity of design, ease of operation and cleanness of cut, equals anything of its kind the writer has ever seen in home-made machinery.

The photo shows plainly how it is constructed, and needs little explanation. The outside uprights are grooved to allow the inside frame, which is tongued to correspond, to slide freely but with as little side play as possible. The cutter is composed of two discarded planer knives, fastened diagonally, end to end, on the top cross-piece of the frame, with the bevel pointing toward the operator. The cutter is operated by pressing the lever at the bottom of the frame with the foot. The wagon spring shown, forces the cutter back into position when the pressure is released.



Trims Veneers accurately and quickly.

The wooden table on which the veneers are placed is brought as closely as possible to the cutter, and the knives, being fastened in a slanting position, make a clean, shear cut, either across the grain or in any direction. A demonstration by the operator showed that veneers could be cut neatly and as fast as he was able to feed them in.—Veneers.

Regulating Heat for Glue

By Edwin Bennett

"What I want to know," said the glue room man, "is this: If 170 degrees of heat is injurious to glue, and 200 practically ruinous, then how much damage does 150 degrees do? Is all heat damaging to a certain extent, and why not devise some way to dissolve and use glue without heating it at all? Here we have one man saying that if you heat glue beyond a certain temperature you destroy half its strength. Here comes another man with the same song, only in a different key, and he sets another figure for the damage place. Then we can find by comparing present knowledge and past practices that our ideas, if not the glue itself, have undergone some changes.

"We used to think it took more heat to damage glue than we do now. We learned long ago that glue could be ruined by heat, as long ago as we begun to prepare it in one vessel inserted in another that had water in it, but we figured somehow that it took a heat beyond the boiling point of water—a burning heat, so to speak—and there was no thought of damage being done to it as long as there was water or steam between the vessel containing the glue and the fire. We figured that it took some direct contact with the bare heat of the fire to do harm. Now we have gotten away from that—have learned that glue can easily get hot enough to damage, even when the vessel containing it is immersed in water.

"Now, what I want to know is this: Where is the minimum, the low point in temperature at which there is no harm done whatever to glue? If we recognize now that beyond 160 degrees damage to glue begins, will we, by and by, lower this again, and finally discover that all heat does damage to glue in a certain graduated ratio, or is there a certain point below which no harm is done? That is the thing that is bothering me right now, for if there is a point of that kind I want to know about it, and if there is not, if all heat does damage, I think we should begin to try for other things than heat for putting glue in shape to use."

How Much Heat Is Necessary to Damage Glue.

It really does not follow that because certain degrees of heat do damage to glue that other degrees of heat will do damage in proportion as they are lower or higher. To understand the point here, let us consider a piece of wood and this same heat. Heat will do no perceptible damage to wood till it reaches a certain high point—let us say 400 degrees—and then it will likely break into flame and be destroyed. Or, take iron, and one could put a piece of it in an ordinary fire, where it would get red hot, and the damage would be so little and so slow that it would not be noticeable; but put a fan to the fire and raise the temperature to a certain point and the iron begins to burn and is seriously damaged in a little while. That is, perhaps, the way it is with glue, only the things that happen to glue take place at a much lower temperature.

There is evidently a certain point at which heat begins to do violent damage to glue, a damage that is different from the natural decay of animal matter, that is augmented by increasing the temperature anywhere along the line above the freezing point. There is a point where the structure is broken down, the fibre injured, or something. The authorities seem pretty well agreed right now that this begins when the temperature passes 160 degrees F., and the damage becomes very noticeable at 170 degrees. On the other hand, it is argued that it takes 140 degrees to thoroughly melt glue in solution with water and put it in shape to use. So this leaves us a range in temperature of only about 20 degrees for safe working—from 140 to 160—and it is very likely that the nearer we can stay to the lower figure the better it will be for the holding qualities of the glue.

Differences of Opinion About Soaking.

There is some difference of opinion between those who ought to know when it comes to the matter of soaking glue before starting in to heat it for use. Some object to the preliminary soaking, and claim that the soaking and heating should all start in together, the temperature being raised slowly and gradually. Others—and, seemingly, the majority—hold that soaking or dissolving glue in advance of heating is the best thing to do, if it is done right and not too far in advance. And here, again, we come across the problem of temperature, for we are warned against soaking glue in warm water. This seems to justify the glue room man's enquiry about all heat hurting glue in proportion to its intensity. But it is a different thing, a different kind of damage that comes in here.

It is merely that hot water aids decay and causes the glue to go stale or bad sooner. Some say that the water for soaking glue should be lukewarm and others that it should be cool. Perhaps it depends on the time calculated on for the soaking. If the glue is thin and comparatively easy to dissolve, so that the supply for next day can be dissolved over night in cool water, that is the thing to use. If it is a matter of getting some ready for use in an hour or two, it may be better to use warmer water, and so on. The idea is to get the glue softened and at the same time not have it go stale.

There is another point in connection with dissolving glue—one that has not been the subject of as much discussion as that of temperature—and that is the purity of the water used. A well-known glue man once told of finding the source of trouble complained of with his glue in a boiler compound, some of the chemicals of which had gotten into the glue. There is other evidence, too, that only a little of certain chemical impurities in water will do damage in glue, yet how many ever take the trouble to analyze the water used in connection with their glue to see how strong it may run in lime or some other foreign substances likely to do damage. We know that there are waters which will corrode and pit the interior of boilers, and that plants are often equipped for purifying the water for boilers. Isn't it a matter of even more importance that we have pure water for mixing glue?

This thing of putting glue to soak in water may carry some of us back to certain directions in connection with medicine and other things which specified dissolving in rain water. The idea was to get a water that was pure. Generally rainwater is what we term soft, too, but we know these days that rainwater is not pure, for it takes up smoke and other things from the air. So we can hardly play safe by saying to use rainwater for glue-soaking, though that would perhaps be safer than some that is used. Distilled water would come nearer to being the correct thing, and perhaps that is what we will come to some day—the using of distilled water which has been immediately cooled to prevent it from going stale.

Room for Research Work.

Meantime there is room for some research work along the line of analyzing and treating water for glue use just as we to-day analyze and treat water for use in boilers, according to its needs for the purpose used.

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The same thing that will render water good for boiler use may not render it fit for glue, and then again it may. This is a part of what the research work should determine. One man who has evidently experimented some along this line says that what is termed hard water is not good for glue, the lime in it causing some deterioration. He points to a simple treatment for softening hard or lime water, which consists of adding about half a pound of ordinary washing soda to 1,000 gallons of water. This and perhaps other simple remedies may be good, but it is doubtful if they are good enough. If there is a question of impurities in water that will do damage to glue, this is certainly a question for scientific handling and not one for guesswork and simple remedies. One should find the exact nature of the impurities in the water, the agent that will remove them, and then, whether or not the water will afterward be good for glue work. Research should determine by and by just what kind of water is best for dissolving glue, and how to go about getting it in a positive manner.

And here's another thing: If one takes to the distilled water idea one should be careful even of condensing the steam from the boiler plant. If it is a plant using soft water, and no compounds that may be found chemically present in the steam, well and good. That is, if the steam is taken directly from the boiler, but one should fight shy of exhaust steam from the engine or any other source where oils or greases have been used if one would get pure water. Indeed, when you get right down to the fine points, pure water is a pretty hard thing to get. Yet it may not be so hard to get water in good shape for glue. The point is to find out and to know more positively about it. That is why the research work is suggested.

Making Old Sand Belts New

A workman, on experimenting, found that the life of garnet cloth belts, used for sanding veneered stock, could be prolonged half again as long as formerly simply by washing them carefully in cold water and then stretching and drying them.

Under this treatment a belt which has become apparently useless is made to give half the service of a new one. The caked dust is entirely removed from between the particles of garnet and the belt is made clean and fresh. In employing the process it is essential that care should be exercised so that cold water only be used. Otherwise the glue might be loosened. The operator also must be careful not to crack the glue in handling the belt.

This plan as brought out through the suggestion system in use in this plant, considering the present cost of materials, has effected a considerable saving.—Factory.

A Waterproof Glue

To about a pint of ordinary glue add ¼ oz. of bichromate of potash, dissolved in a little hot water This glue can be made any consistency that the particular work requires. It should be kept in the dark as much as possible after being mixed, under which conditions it will remain good for a week or so.

It is a little slow in assuming its waterproof character, but when it is set, nothing less than strong acid, which would destroy it, will dissolve it. If it is desired to have the glue pliable, as for gluing a belt, add a little glycerine, when it will always remain flexible. —Decorators' and Painters' Magazine.

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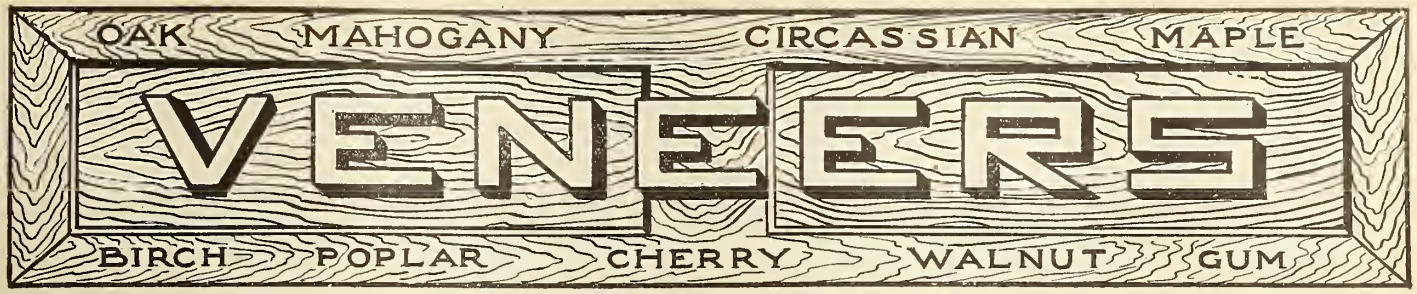

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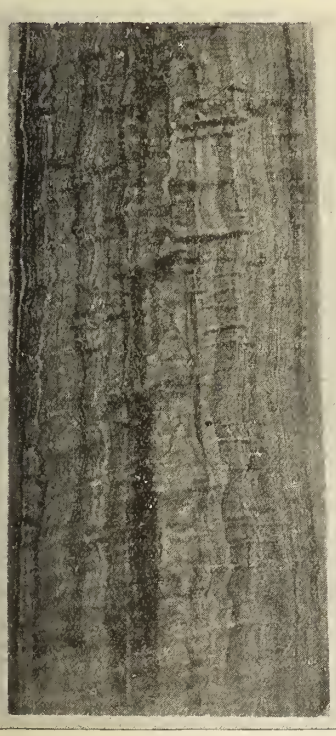

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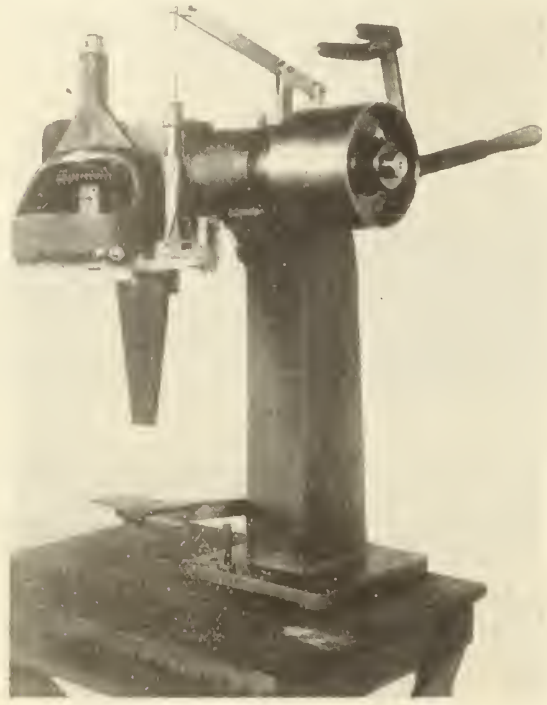
Reynolds Screw Counting Machine

The accompanying illustration shows a useful machine that has been placed on the market by the Reynolds Pattern & Machine Company, Moline, Ill. This machine counts screws and delivers them into packages. It finds its uses in such lines as the manufacture of hardware, and in factories making knock-down furniture where it is necessary to pack a certain number of screws with each unit.



Machine for counting screws and dropping them into packages

To operate the machine the package is set on the pad on the end of the lever below the chute and the lever depressed. This, by means of suitable mechanism, operates the escapement, and the proper number of screws is delivered into the package. The package is then removed and the operation repeated. The Reynolds Pattern & Machine Company advise us that it is their intention to further develop this machine so that it will deliver screws in gross lots, if the demand for such a machine will justify them in placing it on the market.

One Way to Increase Production

Forms and patterns were left strewn around the machines in one furniture factory until only an old and experienced man could tell which should be used on any order and sort it from the heap. This often resulted in much spoiled work with its consequent lost time and inefficient production.

Often the shapers would be idle nearly thirty per cent. of the time while the operators searched among a pile of forms for the particular ones wanted or consulted with the foreman as to which ought to be used, then only experience and much sorting enabled them to get the right ones. Even then mistakes were made frequently.

When an effort was made to increase the output of the plant, this condition was noted. In order to save time in selecting knives a special cupboard was built along the wall in which the knives were arranged, after being marked with the number and style and piece for which they were made. A hole was bored in all the forms and patterns, each was marked with its style number and all were hung in numerical order along the wall.

To decrease the number of these patterns, the list of styles was reduced to a minimum. To eliminate as far as possible any confusion, patterns used infrequently were classified and placed in a disused building.

After these changes were put into effect there was no idle time at the shapers except for setting up. Neither was it necessary to keep an operator at the machine whose principal ability consisted of memorizing various shapes.

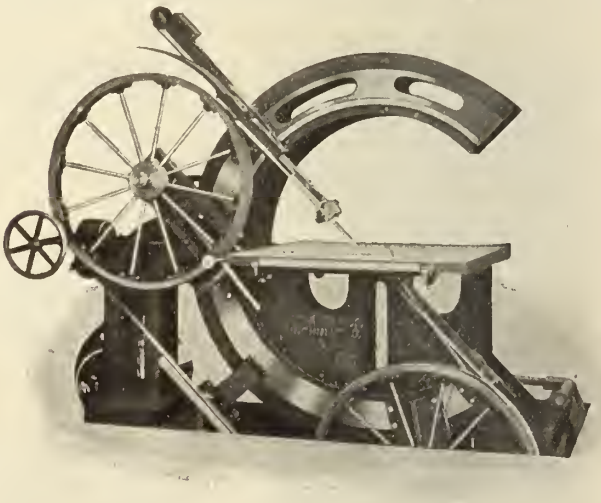
This classification of knives and jigs not only relieved the men of an unnecessary memory burden but saved a great many mistakes with their resultant waste in both time and material.—L. J. C. in Factory.

New Fay & Egan Ship Saw

The unprecedented demand for ocean-going vessels, coupled with the scarcity and high price of steel, has resulted in a big revival of the wooden ship industry. J. A. Fay & Egan Co., of Cincinnati, Ohio, state that, having anticipated this condition some time ago, they had prepared designs for a ship saw capable of working the extra large timbers that would be required in building these great ocean-going boats of wood.

This machine has wheels 48 in. in diameter and angles 45 degrees to either the right or left. The primary angling movement is by power, with auxiliary hand adjustment. Blade can be angled by either power or hand while it is sawing, to follow the pattern on ship timbers. The wheel shafts are mounted in SKF ball bearings, and housing that carries the wheels travels on "Hyatt frictionless, self-lubricating, roller bearings" mounted on the main column.

The Fay & Egan Company claim that this is a much bigger and more powerful machine, with a wider range of work, quicker adjustments, lower power rating, than any machine ever offered for ship work.



Saw for working large ship timbers.

The illustrations herewith show the machine with the saw blade vertical, angled 45 degrees to the right and 45 degrees to the left.

Further information and detailed quotation can be obtained by application to J. A. Fay & Egan Co., 153-173 W. Front Street, Cincinnati, Ohio.

ATCO EXCEPTIONAL SERVICE

DEMAND of those firms from whom you purchase your raw material the same service your customers ask of you.

Manufacturers of lumber whose facilities are such as to assure you of not merely an occasional, but a constant supply are able to answer that demand—

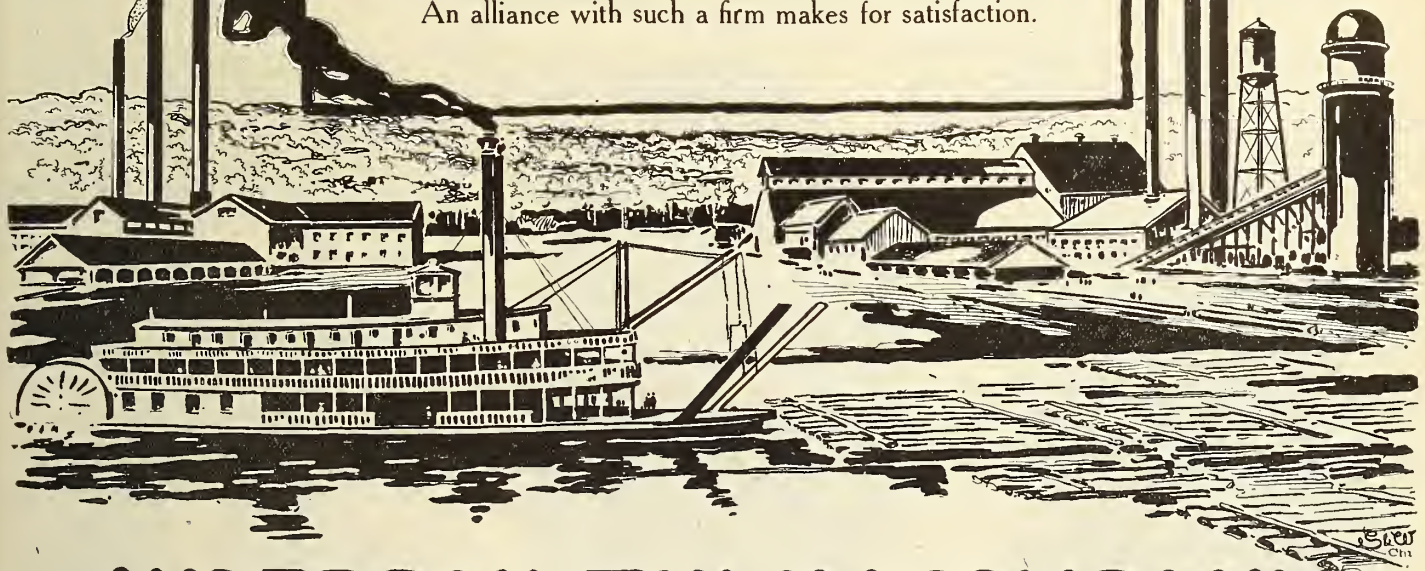
Add to that **ability** to serve the desire to serve **best** and your demand—no matter how exacting—is satisfied.

Such a service is ATCO (Anderson-Tully Company)—

Exceptional in that it is able to supply all of your Southern hardwood requirements from FIVE modern mills, whose annual capaci y is Seventy-five Million Feet of Oak, Gum, Cottonwood and Elm ; a Veneer Plant cutting Gum Core-stock, Built-up Panels and Drawer Bottoms—

Exceptional in that it offers you quality based on the If-I-Were-You Code—A Golden Rule Standard.

An alliance with such a firm makes for satisfaction.



ANDERSON TULLY COMPANY
MEMPHIS

Canada Metal Company's Annual Convention

Enthusiastic Gathering of Representatives—Company Congratulates Men on Year's Work—Prizes Presented to Winners in Sales Competitions

The fifth annual convention of the Canada Metal Company, Limited, was held at the head office, Toronto, during the week of February 12th, and was the occasion of the coming together of representatives and managers of the company from all parts of Canada. The convention was one of the most successful that the company have ever carried out.

Mr. W. G. Harris, Jr., who presided, delivered an address of welcome, expressing the pleasure of the company at meeting its executive staff annually under such pleasant conditions. Not only did this enable them to become better acquainted with one another, but afforded an opportunity for exchanging ideas and experiences and thus obtaining a more extensive acquaintance with the lines manufactured by the company.

During 1916, Mr. Harris said, the Canada Metal Company had made greater progress than in any previous year, and twice during the year they had enlarged the Toronto factory, which now included five acres of floor space, and every inch was fully utilized. Moreover, in the near future, further extensions would be necessary. They had experienced many difficulties during 1916, but they felt unusual pride in being able to congratulate the salesmen upon the excellent results obtained during the year. The increased business handled during 1916 was a matter for congratulation in view of the extraordinary conditions that prevailed in the markets for their products and in connection with the rapidly advancing costs of raw material, and the scarcity of labor.

Throughout the year, their factories had been taxed to capacity, but their continued increase in manufacturing equipment would enable the company to handle a larger volume of business in 1917 than in 1916.

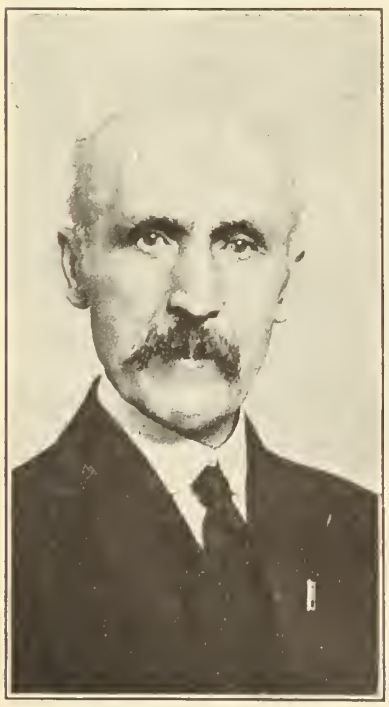
Discussing the report of sales for the year, Mr. Harris said that one of the most interesting features was the awarding of prizes to salesmen who headed the lists in the various sales competitions. In 1911 a modest competition for $10 per month had been suggested and inaugurated by Mr. H. C. Crow, and under his supervision and guidance the competitions had grown until, in 1916, the value of the prizes reached $1,000. These competitions made it necessary to keep most valuable records, and at the end of each year reports were compiled showing, in value, what each salesman had sold, in babbitt metals, type metals, ingot metals, solders, plumbing supplies, etc.

For general sales, Mr. H. E. Cameron had secured the first prize of $100 and Mr. D. L. Scott had obtained the second prize of $50.

In the Harris heavy pressure competition the first prize was a gold watch and chain, valued at $100. The honor of making this presentation fell upon Mr. H. C. Crow, and in doing so, he pointed out that the 1916 competition had been the most successful the company had ever had. In 1915 they had been so far ahead of any previous record in sales for Harris heavy pressure that when they found in 1916 that they had more than doubled their sales they accepted it as an unquestionable indication, not only of the interest taken by their salesmen in the competition, but of the appreciation of the consumer for this well-known babbitt metal. In presenting the gold watch and chain to Mr. H. E. Cameron, he congratulated him upon his success and paid a tribute to the manner in which he had stuck at it every minute of the time during the past year.

Mr. E. Parkin, of Hamilton, who came second in the Harris Heavy Pressure competition, delivered an excellent address on the subject of "Enthusiasm." His remarks were well received, fully appreciated and loudly applauded by all.

Under the supervision of Mr. W. G. Harris, Jr., an



H. E. Cameron.

W. G. Harris, Sr.

E. Parkin.

FOR SALE!

1 car Quartered White Oak
4,750′ 1 x 4 and up 55 ins. long
4,700′ 1 x 4 and up 49 ins. long
2,500′ 1 x 4 and up 46 ins. long
2,500′ 1 x 4 and up 43 ins. long

All clear 1 face.

1 car 1 x 4 and up 31″ long Qtd. White Oak
1 car 1 x 4 and up 22″ and 25″ long Qtd. White Oak

Clear 1 face.

2 cars 2 x 2—30″ Clear Oak Squares
1 car 2 x 2—40″ Clear Dry Maple Squares
1 car 2 x 2—19″ Clear Dry Oak Squares
2 cars 2 x 2—8′ Clear Sap Gum Squares
2 cars 2 x 2—4′ Clear Sap Gum Squares
2 cars 2 x 2—30″ Clear Sap Gum Squares
1 car 1 x 1—30″ Clear Dry Oak Squares

Write us when in the market for all kinds of Hardwoods for the factory trade. We specialize in stock cut to your sizes.

The Probst Lumber Co.

Cincinnati, Ohio

Rexford Veneer Tapes

Combine all the qualities desired by manufacturers and users of veneers.

"Let a sample roll tell its own story"

Please state your requirements and, if possible, send sample of tape you are now using.

Rexford Gummed Tape Co.

Manufacturers

Home Office, 598 Clinton St., MILWAUKEE, Wis.

St. Louis, Mo. Branch, 416 Rialto Building. Olive 3529
Chicago, Ill., Branch, 20 E. Jackson Blvd. Harrison 6107

- AT YOUR SERVICE -

To high-class factory trade we offer the following choice lots of

WHITE PINE

2 Cars—1 x 8/up C. Sel. and Btr.
1 Car —1 x 8 D. Sel.
2 Cars—1 x 8 No. 1 and 2 Cuts.
2 Cars—1 x 8/10 in. No. 3 Cuts.
2 Cars—1 x 4/6 in. Good Strips.
1 Car —1 x 4/up Good Shorts.
1 Car —5/4 x 4/7 in. Good Strips.
28 M.′—5/4 x 8/up C. Sel. and Btr.
34 M.′—5/4 x 8/up D. Sel.
29 M.′—5/4 x 6/up No. 1 and 2 Cuts.
15 M.′—5/4 x 4/up No. 3 Cuts.
1 Car —6/4 x 8/up C. Sel. and Btr.
1 Car —6/4 x 8/up D. Sel.
1 Car —6/4 x 6/up No. 1 and 2 Cuts.
1 Car —2 x 8/up C. Sel. and Btr.
1 Car —2 x 8/up D. Sel.
1 Car —2 x 8/up No. 1 and 2 Cuts.
1 Car —2 x 4/up No. 3 Cuts.

Also the following

CRATING

2 Cars—1 x 3 Spruce Crating.
2 Cars—1 x 4/up Spruce Cating.
4 Cars—5/8 x 4/up Spruce Crating.

All ready for Prompt Shipment and in good condition.

SEND YOUR INQUIRIES FOR HARDWOODS

Graves, Bigwood & Co.

Manufacturers

of

PINE
HEMLOCK
HARDWOOD } **LUMBER**

712 Traders Bank Building
TORONTO - ONT.

Mills at—Byng Inlet, Ont.
and
Deer Lake, Ont.

H. C. Crow.

W. G. Harris, Jr.

F. Harris.

exhaustive discussion then took place in regard to babbitt metals. Many metallurgical tests were then made and illustrations given of the manner in which raw material is first taken to the laboratory and thence to the large melting pots which have a capacity of 35 tons.

Chemical tests were next carried out, illustrating the methods of testing the alloy during the melting period, and this was followed by showing the practical use of the friction testing machine. Mr. Harris laid emphasis upon this feature, so as to give a proper understanding of the company's reasons for guaranteeing their babbitt metals to give excellent service. With this information the salesmen would go forth and feel competent to answer any questions regarding the production of absolutely perfect alloys, and even to describe in minute detail the process of production. A report was then presented of the year's babbitt metal business, and it was shown that if all the babbitt metal sold by the Canada Metal Company in 1916 were gathered for one shipment it would take a train load of 43 cars to move it.

One of the plans in operation by the company for encouraging the salesmen to educate themselves thoroughly in their lines is that they are asked to send in questions which are to be brought up during the convention for discussion. For some weeks previous to the convention these questions are sent in, and the interest taken by salesmen in this opportunity is illustrated by the following examples:—

(1) What do you mean by specific gravity? describe how to estimate it and give an example.

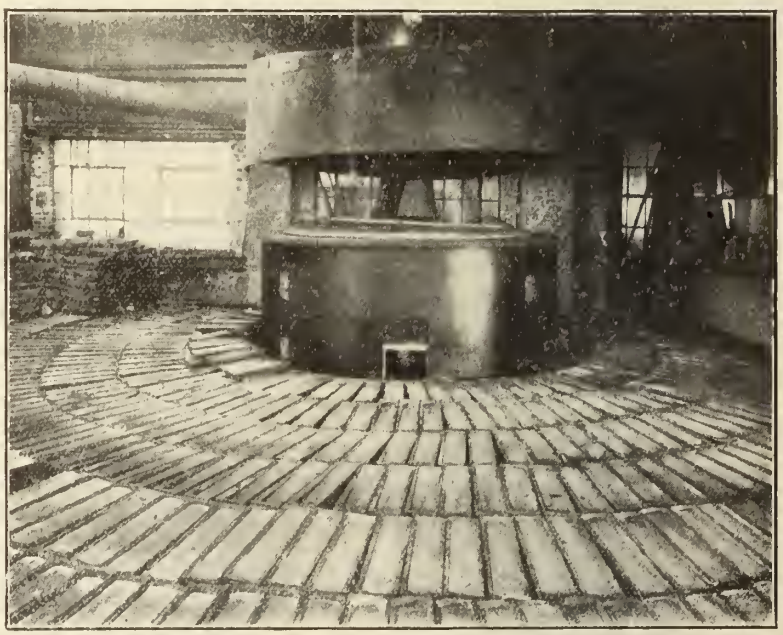
(2) How do you determine the Brinell hardness of metals?

(3) What is the electro-magnetic-method of determining the hardness of metals?

(4) What is the scleroscope?

These subjects were dealt with fully by Mr. H. C. Crow, and examples were given of how to ascertain the specific gravity of metals, or of any other substance which is insoluble in water.

Visits were then paid to the different departments of the factory, and the salesmen were afforded an opportunity of seeing the actual making of lead traps, lead bends and lead pipe, thus obtaining a wider acquaintance with the goods produced than they could obtain in any other manner. It was especially instructive to them to see lead pipe made of all sizes up to 12 inches in diameter. The latest press installed was operating and made a length of pipe 12 inches in diameter, and 12 feet in length, which weighed approximately 600 lbs. Wire solders were also made, and the salesmen were given examples of various grades and sizes, from No. 8 gauge to the finer sizes up to 21 gauge.



Canada Metal Co.'s 35 ton babbitt metal melting pot.

A demonstration was also given of the production of sheet lead. The pig lead was first exhibited, and, after being melted and made into large slabs, it was transferred to the rolling department, where sheet lead was made in all sizes and lengths up to 7 ft. 8 ins. in width and 50 feet in

(Continued on page 58)

Canada's Premier Hardware House

Sellers of Good Hardware since 1885

BETHLEHEM SHELL BOX HARDWARE

The profits you make on the manufacture of your shell boxes depend upon the two vital factors—the ability to purchase your supplies at the right prices and the efficiency and capacity of your factory.

The Bethlehem Shell Box Hardware manufactured by Toronto Lock Mfg. Company, for which we are the sole selling agents, is of tried and tested quality. The large volume of our trade on Galvanized Tie Rods, Lid Plates, Bottom Plates, Wing Nuts, Split Rings, Chain and Cotter Pins is the result of two years' specialization in shell box hardware. We can also supply you with Double Stranded Galvanized Wire, Galvanized Staples, Nails, Wood Screws, etc.

Get our Catalogues of

Builders' Hardware — Factory and Mill Supplies
Constructional Hardware — Cabinet Hardware
Fire Door, Garage and Stable Hardware

Canadian Agents for—Universal Casters
Barton's Garnet Paper

SPECIAL MADE-TO-ORDER HARDWARE

Let Us Quote You On Anything In Hardware

THE
VOKES HARDWARE CO.
LIMITED

40 Queen East
Toronto - Canada

News of the Trade

The Cummer-Dowswell Company, of Hamilton, Ont., are erecting a $10,000 addition to their factory.

The ratepayers of Midland, Ont., have passed a by-law granting a $25,000 bonus to aid a shipbuilding plant which it is proposed to erect at that place.

The woodworking plant of P. N. LeBlanc, Moncton, N.B., was recently visited by fire. The damage sustained, however, was slight, and was mostly caused by water.

The Peterboro Planing Mill, at Peterboro, Ont., has been damaged by fire. It is thought that a pile of dry material left against the chimney was the cause.

W. J. Trick & Co., manufacturers of interior fittings, Oshawa, Ont., recently suffered heavy damage to their factory by fire. The loss on the building and machinery is estimated at $75,000.

The Keenan Woodenware Manufacturing Company, of Owen Sound, Ont., are erecting an addition to their factory. The structure will be three storeys, 60 by 100, of mill and brick construction.

A by-law will be submitted to the ratepayers of Kincardine, Ont., to secure their approval for the granting of a free site to J. B. Watson, who proposes to erect a furniture factory, at a cost of about $50,000.

British Columbia is to have a new industry, the Vancouver Equipment Company, Ltd., having been incorporated, to manufacture railway coaches, carriages, wagons, etc. The head office of the company will be at Vancouver, B.C.

A fire occurred recently in the wood shop of the Canada Carriage Company, Ltd., at Brockville, Ont. The company advise us that their loss amounts to about $4,000, and that it was only necessary to suspend operations for about one day.

Henry F. Rapp, who has been a traveller for Peppler Brothers, furniture manufacturers, of Hanover, Ont., died at his late residence in Stratford, Ont. Mr. Rapp was well known and respected among furniture dealers of the province.

The contract has been let for the foundations of the slasher mill and pulpwood conveyor towers for the Belgo-Canadian Pulp and Paper Company, Ltd., Shawinigan Falls. This company recently erected a large planing mill at the same place.

Emard & Co., shell box manufacturers, Montreal, Que., have registered. Antonio Benoit and Raymond Emard are the proprietors. The present factory belonging to Raymond Emard, at 1315 Papineau Avenue, Montreal, will be used by the partners.

A new company has been incorporated at Montreal, under the name of the "Northern Toys and Turnings Company, Ltd.," with a capital stock of $149,000. Among those interested are Joseph Roy, J. R. Sylvestre, and Edouard Parent, all of Montreal.

The National Piano Company, Ltd., has been incorporated, with capital of $1,000,000. The head office will be located at 226 Yonge Street, Toronto, when alterations now being made are completed. The temporary office is care of Cawthra Mulock Company, 12 King Street East.

The Canada Furniture Manufacturers, Ltd., with head office at Woodstock, Ont., are rapidly completing plans for the operating of their Wingham factory, since the destruction of their Wiarton plant by fire. They expect to open the Wingham plant with about 30 employees, increasing this number from time to time. The lines formerly manufactured at the Wiarton factory will be manufactured at Wingham. We understand that considerable new equipment is to be installed and the factory brought up to date in every respect.

A new enterprise has been started at Brantford, Ont. The Baynes Carriage Company, Ltd., has been incorporated, with a capital of $50,000, to manufacture vehicles and conveyances of all kinds. James Harley, Edmund Sweet, and A. M. Harley, all of Brantford, are interested in the new company.

The executive committee of the Sportsmen's Patriotic Association, of Toronto, has sanctioned an order for the purchasing of $30,000 worth of toys for next Christmas for distribution to the children and dependents of those who have gone overseas. This should create business for the manufacturers of wooden toys.

Mr. M. A. Smith, of Newbury, Ont., is preparing to start a basket factory in a building known as the Johnson planing mill. Mr. Smith has had considerable experience in the manufacture of baskets, having conducted a basket factory of his own for some years, prior to which he was engaged with Gardner Bros., of Leamington, Ont.

The Doherty Piano Company, of Clinton, Ont., will not disappear entirely from business circles. A new charter has been taken out by some London capitalists and manufacturers. They will perpetuate the name under Doherty Pianos, Ltd. The new owners have been authorized to use $200,000 in making a success of this old established business.

The Grand Trunk Railway Company have under construction extensive car shops at Port Huron, Mich. These include two passenger car shops, two freight car shops for wood and steel cars, cabinet shop, wood mill, dry lumber storage, paint shop, drying kiln, and power plant. The shops are to be built around the power plant. The latter will consist of six tubular boilers, totalling 900 horse power.

The large woodworking plant at Collingwood, Ont., owned by Wilson Brothers, has been totally destroyed by fire. The loss is in the neighborhood of $100,000. It is estimated that at least two-thirds of this is covered by insurance, but this still leaves a heavy loss for the company to bear. The origin of the fire is a mystery. This industry has been in continuous operation for almost a quarter of a century. It was established by John and Daniel Wilson, later being made into a joint stock company. At the time of the fire there were between 30 and 40 men on the pay roll, with the prospect that this number would have been increased shortly. The stock carried was heavy, upwards of 75,000 feet of dry hardwood lumber being in the dry kilns, while probably one-third of this quantity was in the factory, in the process of being worked up. In the yard there were thousands more feet, the greater part of which, fortunately, was saved. At this writing we are not able to state whether the plant will be rebuilt.

Finland Box-Making Methods

The box shook industry in Finland is much more highly developed than on the Pacific Coast, reports Robert Labbart, manager of a large box shook and excelsior plant at Jacobstad, Finland, who has been in the United States for nearly a year, visiting various woodworking establishments. Mr. Labbart mentioned particularly the methods of bundling. He said that his factory is equipped with machines which bundle with wire. He said that whereas he found in Pacific Coast box factories that three hundred bundles per day was a pretty fair average for one man, his plant turns out upwards of six hundred bundles per man per day. Mr. Labbart was greatly shocked at the large amount of lumber sent to the refuse burners in Pacific Coast mills. In Finland practically everything is used for some purpose.—"Barrel and Box."

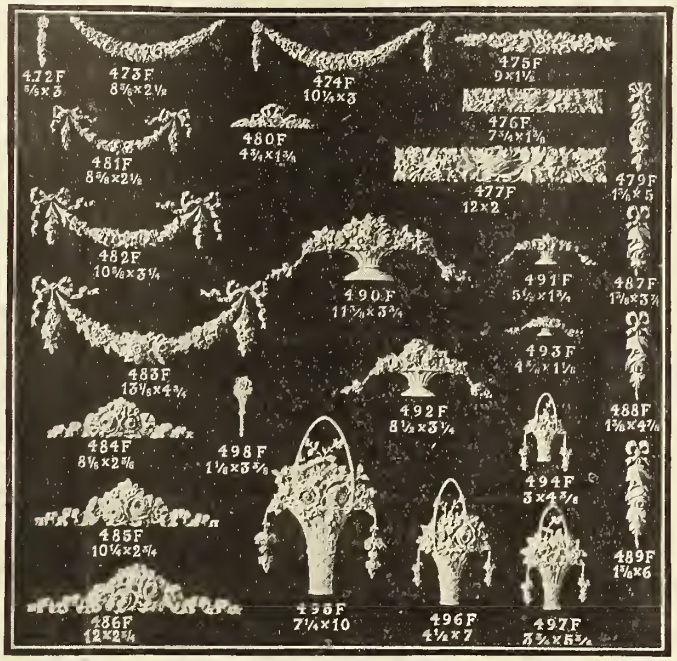
CARVINGS FOR PERIOD FURNITURE

Composition Carvings

are now extensively used for furniture decorations.

This is a material that will interest all manufacturers of furniture.

Write for Catalog and prices.



Most durable and practical Carvings on the market.

We have thousands of stock designs in all the different styles; can also manufacture according to your special designs.

Samples sent on request.

THE DECORATORS SUPPLY CO., 2551 Archer Ave., Chicago, Ill.

Kitchen Cabinet Trimmings

In Many Designs and Finishes

Our cabinet hardware catalog shows these goods in detail. Send for copy for your file.

We have several new catches on the gravity principle—Get our samples and prices.

THE BURNS & BASSICK COMPANY, BRIDGEPORT, CONN., U.S.A.

WANTED

A second-hand horizontal shingle and heading machine.

Hillsboro Woodworking & Mfg. Co., Ltd.
Hillsboro, N.B.

For Sale—Panel Poplar

1 Car 5/8 in., 7 to 17 in. wide, mostly 12 in. and up
48,000 ft. 5/8 in., 17 to 23 in. wide, 50 per cent. 16 ft. long.
32,000 5/8 in., 24 in. and up wide, 50 per cent. 16 ft. long.
21,000 ft. 3/4 in., 24 in. and up wide, 50 per cent. 16 ft. long.

CHARLES F. SHIELS & CO.,
12-1-2 Cincinnati, Ohio.

BARGAINS
IN
SECOND-HAND
Woodworking Machinery

Band saws (2) 36 in. McGregor.
Boring Machines (2) Cowan Post.
Clamp, Greenlee, for Sash.
Clamp, American, for Sash.
Clamp, Cowan, for Doors.
Dovetailer, American, for Sash.
Dovetailer, Fay-Egan, for Drawers.
Fan, 60-in. Double American.
McGregor-Gourlay 12-in. (Jointer).
Jointer, 24-in. Cowan.
Knife Grinder, 36-in. Cowan.
Lathes, Turning (four of them).
Moulders, 8 in., 10 in., and 12 in.
Matcher, Berlin No. 94.
Matcher, McGregor & Gourlay.
Mortiser, New Britain Chain No. 1.
Mortiser, New Britain Chain No. 7.
Mortiser, Cowan Chain No. 255.
Mortiser, McGregor Upright Chisel.
Mortiser, Greenlee Hollow Chisel.
Nailing Machine, Morgan.
Resaw, Berlin 54-in.
Resaw, Cowan 48-in.
Relisher, Greenlee for Sash.
Sander, 60-in. Columbia 3-Drum.
Sander, Schimmel, Belt.
Sander, 20-in. Disc.
Sash Sticker, McGregor Double P & B.
Sash Stieker, American No. 3 Double.
Sticker, Door, American No. 5 Double.
Saw, Variety (several).
Saw, Rip, Hand Feed (several).
Saw, Power Feed (several).
Shaper, McGregor Double Spindle.
Tenoner, Houston Single.
Tenoner, McGregor-Gourlay, Single.
Tenoner, E. B. Hayes, Double End.
Veneer Press Sections (six) 36-in.
Motors, Engines, Shafting, Pulleys, etc.

Write for Prices

J. L. Neilson & Co.
WINNIPEG

Furniture Efficiency Expert and Designer

desires to connect with a Furniture or Woodworking Concern in capacity as efficiency head, superintendent, manager, assistant manager, or designer. Am a man of 29 years, with about 13 years of practical furniture experience behind me in manufacturing, designing, and executive work. For past 5 years as designer, manager, and efficiency engineer with well-known Chicago firms; at present on shop, improvement, and valuation work. If you can use a high-grade man and are ready to pay a fair salary for efficient service such as I will render, a service that in itself will more than pay my salary, besides improving and increasing your production and lowering your costs, address me at Box 32, Canadian Woodworker and Furniture Manufacturer, Toronto.

It is but a question of time when an efficiency expert will be as necessary and indispensable to a furniture factory as your designer or superintendent. Can you afford to pass up this opportunity?

WANTED

Band sawyers, shaper men, trim sawyers, aand other woodworking machine men.

FISHER BODY CO., of CANADA, Ltd.
Walkerville, Ont.

Oak Panels

A good oak panel should have oak on the face and back, but the centre may be of any wood that is convenient which will take glue well.

The hand derrick or windlass for swinging blocks into the rotary veneer machine is not only a slow, laborious thing to do this work with, but it also carries more of the element of danger than the more modern hoists.—Veneers.

When you take note of the wonderful progress that has been made in the automobile industry during the past ten years, and then consider the fact that, in the earlier days, veneer entered quite extensively in the form of built-up lumber for auto body work, it naturally leads to some speculation as to what might have happened in the veneer business if wood had continued to be used instead of metal.

To make all the automobile bodies of the present day out of veneer, in the form of laminated stock, would certainly make lively times in the veneer industry, and sometimes we have a feeling that we will come around to this again in the future. As it is, some veneer is used and there is room for more of it, especially in making some of the light truck body sides, and the trade there may be extended considerably if it is cultivated right.—Veneers.

WATCHMAN'S CLOCKS
Hardinge Portable
The only unlimited System.
Patrol clock, each $39.60 complete.
Stations, any number needed $4.10.
Also Key Type Clocks, limited capacity.
F.O.B. Toronto. Write for catalogues.
Signal Systems Co., 110 Church St., Toronto

PETRIE'S
MONTHLY LIST
of
NEW and USED
WOOD TOOLS
in stock for immediate delivery

Wood Planers

30" Whitney pattern surfacer.
26" Revolving bed single surfacer.
26" Revolving bed double surfacers.
24" Galt, revolving bed.
24" Single surfacers, various makes.
22" Stationary bed surface planer.

Band Saws

42" Fay & Egan power feed rip.
36" Crescent, pedestal.
30" Ideal pedestal, tilting table.
26" Crescent pedestal (2).
20" Crescent pedestal (2).

Saw Tables

No. 2 Crescent, combination.
No 5 Crescent, sliding top.
Ballantine variable power feed.
Preston variable power feed.
Cowan heavy power feed, M138.
12' Defiance automatic equalizer.
MacGregor Gourlay railway cut-off.
6' Crescent iron frame swing.

Mortisers

Cowan hollow chisel, M190.
Galt upright, compound table.
Fay graduated stroke.
No. 2 Smart foot power.
No. 1 Smart foot power.

Moulders

13" Clark-Demill four-side.
12" Cowan four side.
10" Houston four side.
6" Cowan four side.
6" Dundas sash sticker.

Sanders

24" Fay double drum.
12" C.M.C. disk and drum.
18" Crescent disk, adjustable table.

Clothespin Machinery

Humphrey No. 8 giant slab resaw.
Humphrey gang slitter.
Humphrey cylinder cutting-off machine.
Humphrey automatic lathes (6).
Humphrey double slotters (4).

Miscellaneous

Fay & Egan 12 spindle dovetailer.
MacGregor Gourlay 12 spindle dovetailer.
Cowan dowel machine, M80.
Cowan post boring machine, M85G.
Cowan post boring machine, M23.
Galt blind slat re-saw.
Cowan sash clamp.
Egan sash and door tenoner.
No. 6 Lion universal woodtrimmer.
Single spindle wood shaper.
48" 3 saw edger.
20" American wood scraper.
16" Ideal wood lathes (3).
4-head rounding machines.
Cowan spindle carver, M63.
Cowan veneer press screws.
Dunbar automatic shingle machine.
No. 1 Hart automatic saw filer.

Prices, Descriptions and Full Particulars on Request

H. W. PETRIE, LTD.
Front St. W., Toronto, Ont.

Buy Something Worth While

—Don't be Influenced by Low Prices or a Coat of Paint

Andrew's 12-ft. double-column borer, 12 heads.
Andrew's 30-in. 3-spindle vertical borer, practically new.
Andrew's single spindle vertical borer, practically new.
Band rip saw, Fay & Egan, 42 in.
Band resaw, Fay & Egan, 60 in.
Band saws, 32, 36, and 38 in.
Glue cookers and retainers. Glue spreaders.
Jointers, 12, 16, 20, and 24 in.
Lathes, Mattison, Nos. 7 and 8, automatic.
Matcher, American Northwest, 24 x 8 in.
Matchers, 24 x 6 in., 3 and 4 sides.
Molders, inside, 13 in., American and Woods.
Molders, 4 side, 9, 10, and 12 in., American.
Molder, Smith latest, 9-in. No. 107-A.
Mortiser and router, Fay & Egan No. 124.
Mortiser, chain saw No. 7, New Britain Mach. Co., six chains.
Rip saw, Greenlee self-feed, heavy, No. 426.
Sanders, 42-in. Columbia, 24 and 30-in. Fay & Egan double.
Saws, combination and variety, tilting table.
Surfacers, American 4½, 36-in. sectional roll and chip-breaker; Whitney 30-in. single sectional roll; 36-in. solid roll; Fay & Egan No. 140 double, 27 and 30 in. divided roll.. Single, 16 in., 18 in., 20 in., 24 in., 26 in., 30 in.
Shapers, Smith's latest, double and single; also Shimer single, with overhead routing arm.
Tenoners, Fay & Egan double end, 8 ft. long, D. H. & D. C.; also several single end.
Timber sizer, Woods 30 x 10, divided rolls.
Veneer jointer, Veneer Machinery Co. make.
Window frame machines, Phillips and Smith & Phillips.
Wood-workers, universal, Fay & Egan 10½ in. and Bentel & Margedant No. 4, 9 in.; also extra heavy Bentel & Margedant 12-in. machine for extra heavy work.

The Osborne & Sexton Machinery Co.

Re-Manufacturers COLUMBUS, OHIO

Distinctive Re-Manufacturing Methods

are responsible for the preference given Wayne Rebuilt Machines in the States

Besides we carry on our own floors a stock of seven hundred machines, including largely modern, select, little used machines. The following are representative of our stock today.

Single Surfacers

2—26" Whitney Cabinet Planers
1—27" American No. 4½ Cabinet Planer
1—24" Fay & Egan No. 156 Cabinet Planer
1—27" Berlin No. 153 Cabinet Planer
1—30" Fay & Egan No. 19 Cabinet Planer
1—40" Buss No. 2 Cabinet Planer
1—26" American "Peacemaker"
1—26" Cordesman No. 22
1—24" Egan Co. No. 2

Moulders

1—6" American 4-Side
1—6" H. B. Smith No. 144
1—7" American 4-Side
1—8" American 4-Side
1—8" New Hermance 4-Side
1—8" Bentel & Margedant No. 28 "Climax"
1—10" American No. 22
1—12" New Hermance
1—12" American No. 22
1—13" Fay & Egan No. 2 Inside
1—12" Berlin No. 125 Inside
1—14" American "Glencove" Inside

Sanders—3 drum

1—48" American "Columbia"
1—42" H. B. Smith Endless Bed
1—42" H. B. Smith Endless Bed
1—42" Berlin "Invincible"
1—42" American "Columbia"
1—36" J. A. Fay & Egan No. 225
1—36" Berlin "Invincible"
1—36" American "Columbia"
1—30" Fay & Egan No. 4
1—30" Berlin "Royal Invincible"

Sanders—Belt

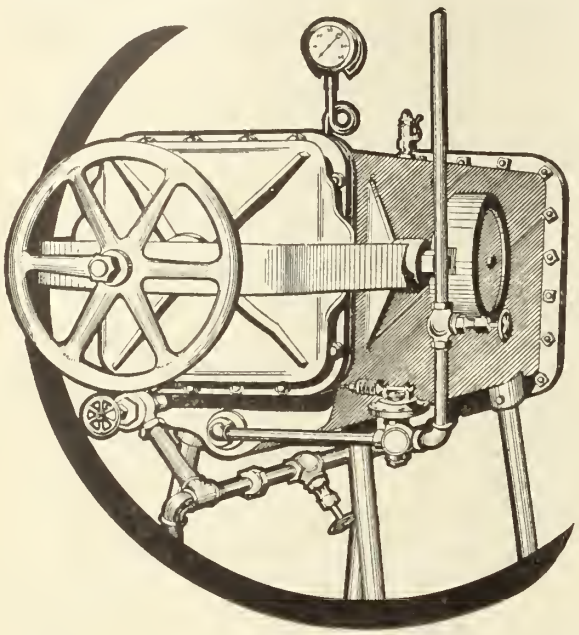
2—No. 171 Wysong & Miles
1—No. 243 Wysong & Miles
1—No. 111 Mattison
1—No. 4 Maddox
1—No. 3 J. A. Fay & Egan

We have woodworking machines of every other kind and for every other purpose in proportion to the above Single Surfacers, Molders and Sanders.

Send us your inquiries. Our methods insure Service and Efficiency.

Wayne Machinery Company, FORT WAYNE INDIANA

Wood Steaming Retort



Wood Bending Manufacturers:

This is one of our

Perfection Retorts

which we guarantee will save you

50% Less Breakage

in your bending department than your present process; that your stock will dry in your forms or presses in one-third less time; that you will have no stained stock; that your stock will retain its shape much better after being bent; that it will dry in your dry-kiln in one-half less time and that your steam consumption will be reduced at least 90 per cent.

The door can be opened and closed in ten seconds, and it is steam and water tight and for this reason can be placed anywhere in your factory.

Compare this IMPROVED RETORT with your present steam boxes, then write us for our Booklet on Progressive Wood Steaming.

Made in Preston, Ontario

Perfection Wood Steaming Retort Co.

PARKERSBURG - WEST VIRGINIA

Canada Metal Company's Annual Convention

(Continued from page 52)

length. An interesting comparison was then afforded by showing the finer rolls which are used for producing tin and lead foils.

Under the guidance of Mr. W. G. Harris, Jr., a tour of inspection was then made to the shell forging plant, which has only been operating for a few months. This was a surprise to most of those present. They were shown the complete process of manufacture from the steel billets to the steel shell (in the rough) ready for the machinist. They were informed that in the near future 12,000 of these rough shells would be produced daily. The salesmen took particular interest in the handling of the red hot bars of steel and their final piercing by the large hydraulic presses.

Subsequently, Mr. W. G. Harris, Jr., replied to a number of questions, such as requests for explanation as to the natures of Tobin Bronze, Muntz Metal, Monel Metal, Pewter Metal and Brittania Metal. He dealt very fully with each of these subjects.

Mr. W. G. Harris, Sr., president and founder of the Canada Metal Company, was unavoidably absent during the commencement of the convention, but after his arrival, delivered an address upon the duties of a salesman and his connection with the firm. He discussed in detail the true meaning of this connection and the necessity for real co-operation between the field, the office and the factory. One of the signs on the wall of the convention hall contained the maxim: "What I can do, I ought to do—what I ought to do, I will do." He urged the salesmen to dwell upon this maxim as it would be a great help to each of them in their work. Those who knew the president's compelling personality realized that when he spoke of putting the "punch" into business he only advised doing what he had always done himself. In fact, as he declared, it was putting the punch there that had built up this enormous organization.

After the passing of the usual votes of thanks, Mr. W. G. Harris, Jr., dismissed the visitors, in a brief, but stirring address. He expressed the hope that all had derived useful knowledge from the meeting and that they would go out upon their work with the same conviction as he himself had, that 1917 would be another great year for the prosperity of Canada. His reasons for this conviction were:—Ontario was busy. Ontario was a producer. Her factories working to capacity, could not keep pace with the demands. New factories were being built. New industries were being established. The whole province was pulsating with the dynamic energy of tremendous commercial achievements.

Canada was making colossal strides in manufacturing. To-day Canada was recognized as a factor in world commerce. We were now exporting at the rate of $173 per capita as compared with $63 per capita in the United States. Canada's total exports were more than one-fifth of the United States' total. Three years ago Canada had an adverse trade balance of $310,000,000. To-day she had a favorable balance of $367,000,000. This meant that in 1913 Canada was buying abroad at the rate of $86 per capita and selling at the rate of $47 per capita; but in 1916 her sales abroad equalled $132 per capita, while her buying remained unchanged at $86 per capita. Canada's net gain in foreign commerce alone during this period was over $677,000,000, or about $85 per capita, and the province of Ontario was producing more than one-half of the manufactured products turned out in Canada.

Let cleanliness abound is a good rule to follow. You can't do clean varnishing with a dirty brush, and you can't have a clean brush for long if you use it on dirty work.

Crating Lumber

5/8" and 1" All Grades
At Right Prices

Try Us—It will be worth your while.

Read Bros., Limited
43 Victoria Street
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Galbraith & Co., Ltd.

Owen Sound, Ont.
Manufacturers of
"Well-Made" Wood Specialties
Toys, Games, Turned Goods and Kitchenware
We Specialize on
CUSTOMS TURNINGS
Your order will receive prompt attention

Really Dry Hardwoods

M B

As evidence of the dryness of Martin-Barriss hardwoods we can refer you to many handsome interiors of elaborate detail.

Our process of drying requires three weeks during which time the heat and humidity of the kilns are kept at an efficient degree.

If our stock does not include the particular figure you want, we will gladly cut into new logs.

Have you our prices?

The Martin-Barriss Co.
Cleveland, Ohio

Subscribers' Information Form

Many letters reach us from subscribers enquiring where a certain machine, a certain kind of lumber or veneer, or some other class of goods, can be obtained. We can usually supply the information. We want to be of service to our subscribers in this way, and we desire to encourage requests for such information. Make use of this form for the purpose.

Date.....1917

CANADIAN WOODWORKER
AND FURNITURE MANUFACTURER,
345 Adelaide Street West, Toronto.

Please tell us where we can procure .....

.....

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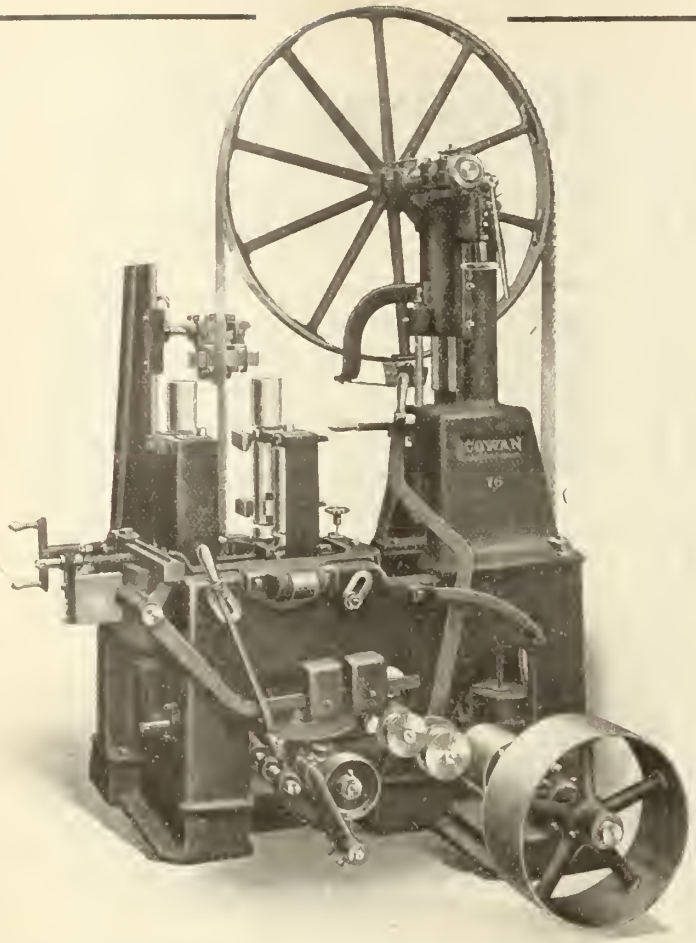
.....

Name .....

Address .....



You cannot afford to decide your

RESAW

proposition without giving our line serious consideration. We manufacture a variety of sizes and types, but can only show one here, which is our

M 76—48″ Wheels

Other Resaws we manufacture, of which we will be pleased to send full particulars on request:

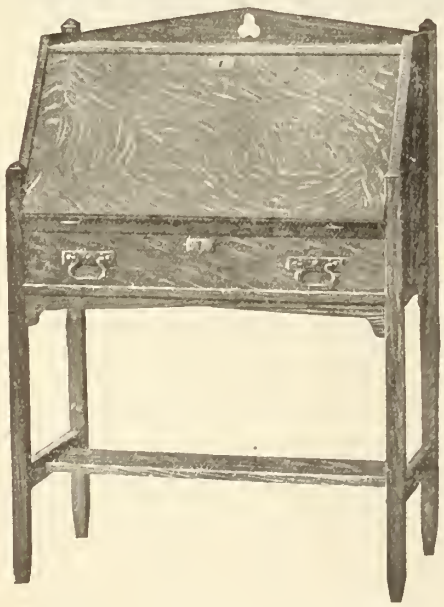
M 171—42 in. Wheels
M 219—48 in. Wheels
M 67—54 in. Wheels
M 170—60 in. Wheels

This latter made with or without lever set works.

COWAN & COMPANY OF GALT, LIMITED

Galt, Ontario - Canada

Perkins Vegetable Veneer Glue



Ladies' Desk manufactured by The D. Hibner Furniture Co., Limited, Kitchener, Ont., in which Perkins Glue was used.

IS A

Uniform, Guaranteed Patented Glue

¶ We have, during the past ten or more years, built up a large volume of business and maintained it, because we sell only

HIGHEST QUALITY

¶ Our list of customers proves the statement that a very large per cent. of the highest quality furniture, including office and household furniture, also doors, interior trim, etc., are built up with Perkins Glue.

¶ Be sure you have *Perkins Quality*—absolutely uniform.

¶ We will demonstrate to your satisfaction in your own factory

Originator and Patentee of Perkins Vegetable Glue.

PERKINS GLUE COMPANY, LIMITED

Address all inquiries to Sales Office,
Perkins Glue Company, SOUTH BEND, Indiana, U.S.A.

Hamilton, Ont.

Don't Take Chances

on your

Veneer Tapes

Obtain the tape best suited for your requirements by taking up with the

Veneer Tape Specialists

Ideal Coated Paper Co.

Mills and Main Office:

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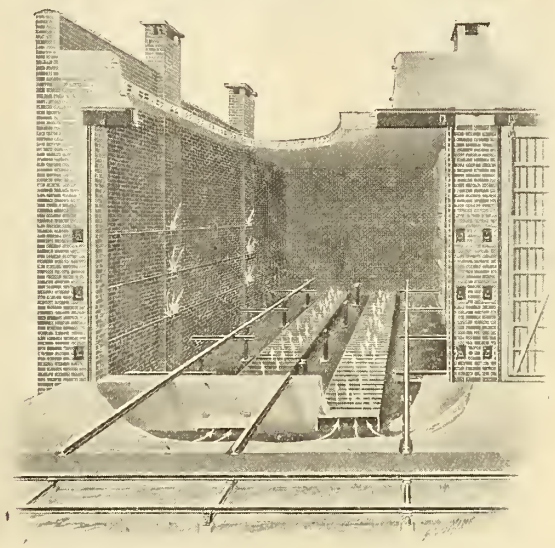
YOUR DRYING PROBLEM

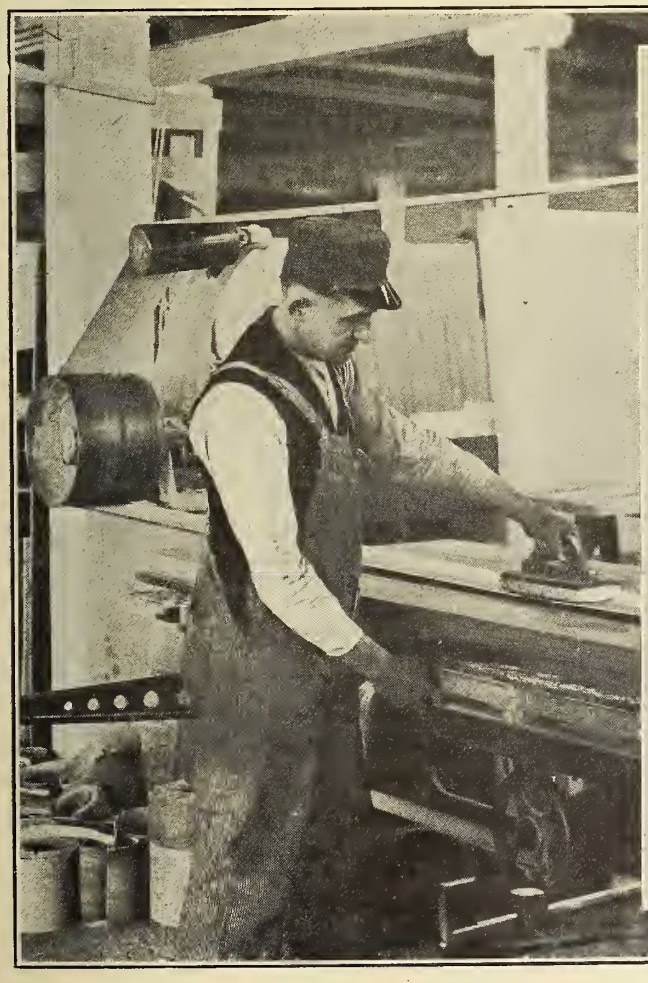


can be solved by installing NATIONAL equipment. Tell us what you have to do, and we will tell you how it can be done, and incidentally show you that the NATIONAL will do it better than any other dry kiln.

Our new catalog will please you

THE NATIONAL DRY KILN CO.

1117 East Maryland St., INDIANAPOLIS, Indiana



Carborundum Brand Garnet Paper and Cloth are Uniformly Graded—Absolutely so

YOU can always depend upon Carborundum Brand Garnet products—they are uniformly coated with uniformly graded North River Garnet. ¶There is never any coarse grain to leave heavy deep scratches on the work. The paper or cloth will not fill because it is uniformly coated with free, clean cutting grain.

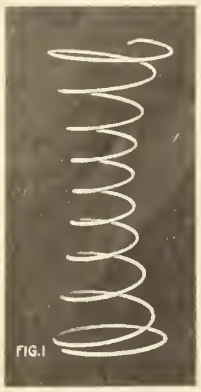
Carborundum Brand Garnet Products are Uniform—Absolutely so

May we send you sample sheets for trial?

THE CARBORUNDUM COMPANY

NIAGARA FALLS, N. Y.

NEW YORK CHICAGO PHILADELPHIA BOSTON CLEVELAND CINCINNATI PITTSBURGH GRAND RAPIDS MILWAUKEE



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for all kinds of Upholstery Work

Constructions for Chairs, Davenports, Carriages and Automobiles.

"Fosters" Multi-Springs and Luxury Springs

Spring Filling for Top Cushions

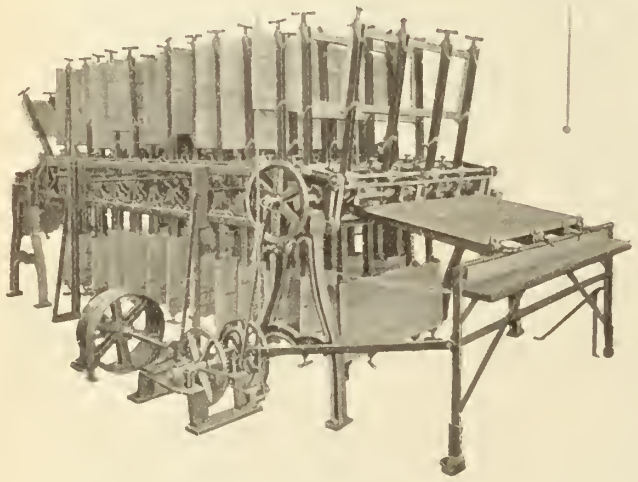
The service resulting from 30 years' experience is at your command.

We solicit your inquiries and an opportunity to submit samples.

FOSTER BROS. MFG. CO., Utica, N.Y., U.S.A.

Billstrom

Glue Clamp Carrier



Here is a machine that will effect great savings in any plant where glued-up stock is handled.

It holds the edge glued stock securely until the glue is set. A glance at the above illustration tells the story.

ASK FOR LIST OF USERS.

Nels J. Billstrom, 2002 Ninth Street, ROCKFORD, ILL.

R. S. Pollard, Preston, Ont.

Many Points of Superiority

are embodied in the

WAYMOTH VARIETY WOOD-TURNING LATHE

This machine in one operation turns, bores and cuts off wood turnings in any size up to 34 inches in length.

It embodies many improvements. There is an arrangement whereby all side motion occasioned by the continual wear of the tail-stock and middle-piece is taken up; by the use of a patent rougher bed a knife is used 10 inches long instead of one about 2 inches, as formerly; a rack and gear is used instead of a stud and crank for operating the swing bed.

Our lathes are sold in Canada by

A. R. Williams Machinery Co., Toronto, Vancouver and Winnipeg.
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A. D. WAYMOTH & CO., FITCHBURG, MASS.

Established in 1845.

DARLINGS STEAM APPLIANCES

DARLING BROTHERS
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Engineers and Manufacturers
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Chapter 1—Historical Notes
Chapter 2—Manufacture of Glue
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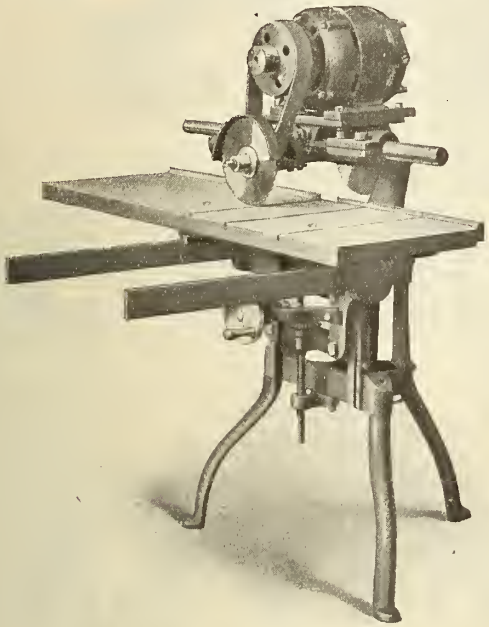
Canadian Woodworker

347 Adelaide St. West - Toronto

THE ELLIOT PONY WOODWORKER



THE ELLIOT PONY WOODWORKER

for Carpenters, Cabinet Makers, Pattern Makers, Toy Makers and all manufacturers who require a light machine.

It will cross cut and rip up to 2 in. thick. Put on saws or dado head, swing slide with carriage to any angle and go to work.

Let us send you full information about this Labor-Saving Machine.

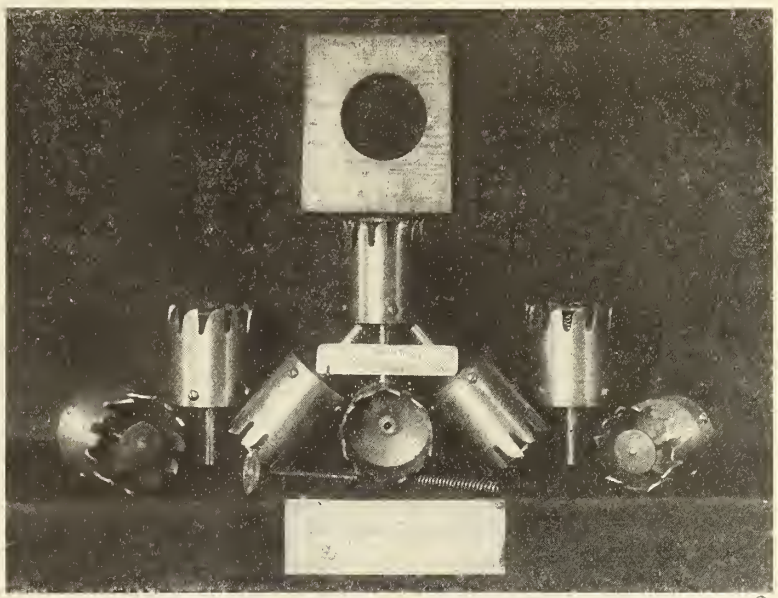
THE ELLIOT WOODWORKER, LIMITED

College and Bathurst Streets **Toronto, Ont.**

"BEAVER" Cylinder Saws for "Bethlehem" Shell Box Diaphragms

These Saws will cut straight holes in veneer diaphragms rapidly and without tearing the different plys asunder. They can be set and filed as any ordinary saw, thus holding their clearance and size. Our latest type saw is fitted with new style core ejector. This kicker bears on exact centre of wood eliminating all friction.

We also supply special cutter heads for taper nose blocks in 4.5" and 18 P. R. Shell Boxes.



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Agents for L. & I. J. White Co., Machine Knives

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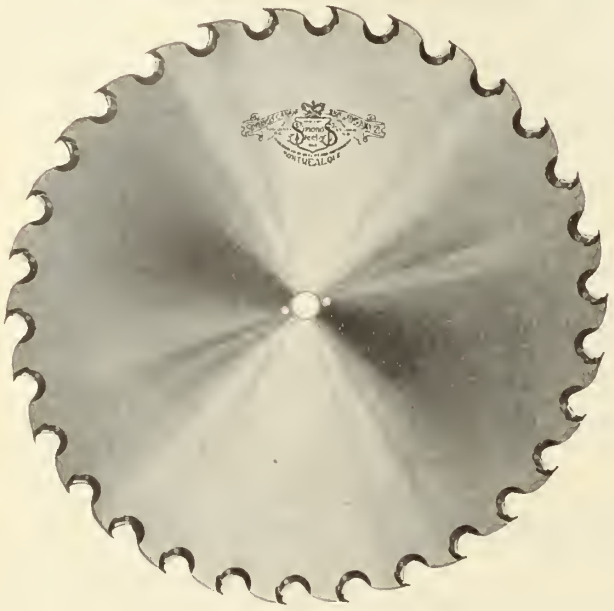
TORONTO, ONT.

SIMONDS



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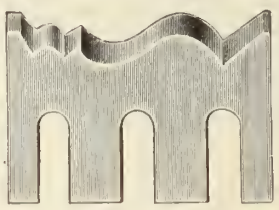
It will be to your advantage to use Simonds Saws and Knives for the reason that they give better service, which means more cutting at less cost of up-keep, cost of filing, delays for changes, etc. These are the important features, rather than what a Saw or Planer Knife may cost when first purchased. But here, too, Simonds are to be preferred because their original purchase price has been reduced to the lowest figure consistent with high quality of material and workmanship necessary to produce these result-getting saws.

We have a catalog which we will be glad to send any wood-working or furniture factory or planing mill foreman, super-intendent, or purchasing agent, upon request.

Simonds Canada Saw Co., Limited

St. Remi St. and Acorn Ave.,

Vancouver, B. C. MONTREAL, QUE. St. John, N. B.



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The Dependable Babbitt

Equally as good for heavy uty as speed. It is especially adapted for manufacturers of woodworking machinery, planing mills, furniture factories, box factories and woodworking plants.

Try it

Our High Grade Babbitt

Owing to its phenomenal ability to absorb oil "Trojan" babbitt will be found ideal for overhead bearings in line and counter-shafts as it is unnecessary to oil as often as with the ordinary babbitts.

Try it

HOYT METAL COMPANY - Toronto, Ont.

NEW YORK ST. LOUIS LONDON, ENG.

"We are Saving over 40% of our coal!"

"I need only clean the boiler once in four weeks!"

MR. O. H. HALE, of the King Furniture Company, Warren, Ohio, is so enthusiastic about the

Morehead
Back to Boiler
SYSTEM

that he has written an account of his experiences which will profit his brother engineers everywhere.
For the Morehead "Back-to-Boiler" Book—with its many pages of data and interesting illustrations—and a complete copy of Mr. Hale's letter, just write

Canadian Morehead Mfg. Co.
WOODSTOCK Dept. "H" ONTARIO

"You never have to think about low water in the boiler!"

"I have worked other Traps but I never saw one as simple as the Morehead!"

GRAND RAPIDS
VAPOR DRY KILN
GRAND RAPIDS
MICHIGAN

Increasing output of other kilns is part of our business.

We can arrange to utilize your present equipment and supplement with sufficient additional to bring your kilns to our basis of output.

We would suggest that you supply our engineering department with description of your kilns and lumber drying needs, so we can understandingly outline what can be done.

Your opening the matter will incur no obligation and we will give you, frankly, the results of our experience.

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The following books are offered at special prices subject to previous sale:

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Saw Fitting Manual, a treatise on the care of saws and knives. Deals with everything in the saw and knife alphabet, from adjustments to widths. 144 pages. Price $2.00.

Common-sense Handrailing, by Fred T. Hodgson. Published by Frederick J. Drake & Company, Chicago. 114 pages, illustrated. Price 50c.

Roof Framing Made Easy, by Owen B. Maginnis. Published by The Industrial Publication Company, New York. 164 pages, illustrated. Price 50c.

"**Carpentry**," by Ira S. Griffith. Published in 1916 by The Manual Arts Press. 188 pages, illustrated. Price $1.00.

Handrailing Simplified, by An Experienced Architect. Published by William T. Comstock, New York. 52 pages, illustrated. Price 50c.

How to Join Mouldings; or, The Arts of Mitering and Coping, by Owen B. Maginnis. Published by William T. Comstock, New York. 72 pages, illustrated. Price 50c.

Utilization of Wood-Waste (Second Revised Edition), by Ernst Hubbard. Published in 1915 by Scott, Greenwood & Sons. 192 pages, illustrated. Price $1.50.

Woodworker Publishing Company, Limited
345 Adelaide Street West, Toronto, Ontario

The "Canadian Woodworker" Buyers' Directory

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Yates Machine Co., P. B., Hamilton, Ont.

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Garlock-Walker Machinery Co., Toronto, Ont.
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Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

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Nash, J. M., Milwaukee, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
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Yates Machine Co., P. B., Hamilton, Ont.

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Cowan & Co., Galt, Ont.
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Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Neilson & Company, J. L. Winnipeg, Man.
Preston Woodworking Machinery Company, Preston, Ont.
Reynolds Pattern & Machine Co., Moline, Ill.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

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Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

CARS (Transfer)
Sheldons, Limited, Galt, Ont.

CARBORUNDUM PAPER
Carborundum Co., Niagara Falls, N.Y.

CARVING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

CASTERS
Burns & Bassick Co., Bridgeport, Conn.
Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.

CLAMPS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Neilson & Company, J. L., Winnipeg, Man.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Company, Montreal, P.Q.

COLUMN MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

CORRUGATED FASTENERS
Acme Steel Goods Company of Canada, Ltd.

CRATING LUMBER
Read Bros., Limited, Toronto.

CUSTOMS TURNINGS
Galbraith & Co., Ltd., Owen Sound, Ont.

CUT-OFF SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, Que.
Yates Machine Co., P. B., Hamilton, Ont.

CUTTER HEADS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, Beloit, Wis.
Shimer Cutter Head Co., Galt, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

DOVETAILING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont

DOWEL MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

DRY KILNS
Grand Rapids Veneer Works, Grand Rapids, Mich.
National Dry Kiln Co., Indianapolis, Ind.
Sheldons, Limited, Galt, Ont.

DUST COLLECTORS
Sheldons, Limited, Galt, Ont.

DUST SEPARATORS
Sheldons, Limited, Galt, Ont.

EDGERS (Single Saw)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont
Simonds Canada Saw Co., Montreal, Que.

EDGERS (Gang)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

END MATCHING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

EXHAUST FANS
Garlock-Walker Machinery Co., Toronto, Ont.
Sheldons Limited, Galt, Ont.

FILES
Simonds Canada Saw Co., Montreal, Que.

FLOORING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

FLUTING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.

FLUTING AND TWIST MACHINE
Preston Woodworking Machinery Company, Preston, Ont.

FURNITURE CARVINGS
Decorators Supply Co., Chicago, Ill.

FURNITURE TRIMMINGS
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Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.

GARNET PAPER AND CLOTH
The Carborundum Co., Niagara Falls, N.Y.
Ritchey Supply Company, Toronto, Ont.

GRAINING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Yates Machine Co., P. B., Hamilton, Ont.

GLUE
Perkins Glue Company, South Bend, Ind.

GLUE CLAMPS
Jackson, Cochrane & Company, Kitchener, Ont.
Neilson & Company, J. L., Winnipeg.

GLUE HEATERS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Kitchener, Ont.

GLUE JOINTERS
Canada Machinery Corporation, Galt, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Yates Machine Co., P. B., Hamilton, Ont

GLUE SPREADERS
Fay & Egan Co., J. A., Cincinnati, Ohio
Jackson, Cochrane & Company, Kitchener, Ont.

GLUE ROOM EQUIPMENT
Billstrom, Nels. J., Rockford, Ill.
Perrin & Company, W. R., Toronto, Ont.

GRAVITY CARRIERS
Canadian Mathews Gravity Carrier Co.

GRINDERS (Cutter)
Fay & Egan Co., J. A., Cincinnati, Ohio

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The Carborundum Co., Niagara Falls, N.Y.

GRINDERS (Knife)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

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GROOVING HEADS
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Anderson-Tully Co., Memphis, Tenn.
Brown & Co., George C., Memphis, Tenn.
Churchill-Milton Lumber Co., Louisville, Ky.
Lamb-Fish Lumber Co., Charlestown, Miss.
Penrod, Jurden & McCowen, Memphis, Tenn.

GUMMERS, ETC.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Machinery Co. of America, Grand Rapids, Mich.

HAND PROTECTORS
Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND SCREWS
Fay & Egan Co., J. A., Cincinnati, Ohio.

HANDLE & SPOKE MACHINERY
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Whitney & Son, Baxter D., Winchendon, Mass.

HARDWARE
Burns & Bassick Co., Bridgeport, Conn.
Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.
Vokes Hardware Co., Toronto.
Weber-Knapp Co., Jamestown, N.Y.

HARDWOOD LUMBER
Aberdeen Lumber Co., Pittsburg, Pa.
Anderson-Tully Co., Memphis, Tenn.
American Hardwood Lumber Co., St. Louis, Mo.
Atlantic Lumber Company, Toronto.
Banning, Leland G., Cincinnati, Ohio.
Brown & Company, Geo. C., Memphis, Tenn.
Burns & Knapp Lumber Co., Connecautville, Pa.
Churchill-Milton Lumber Co., Louisville, Ky.
Clark & Son, Edward, Toronto, Ont.
Dermott Land & Lumber Co., Chicago, Ill.
Farrin Lumber Co., M. B., Cincinnati, Ohio.
Graves, Bigwood Company, Toronto, Ont.
Kersley, Geo., Montreal, Que.
Korn-Conkling Co., Cincinnati, Ohio.
Lamb-Fish Lumber Co., Charlestown, Miss.
Martin-Barriss Co., Cleveland, Ohio.
Mowbray & Robinson, Cincinnati, Ohio.
Paepcke Leicht Lumber Co., Chicago, Ill.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Pickrel Walnut Co., St. Louis, Mo.
Probst Lumber Co., Cincinnati, Ohio.
Read Bros., Limited, Toronto.
Shafer Lumber Co., Cyrus C., South Bend, Ind.
Spencer, C. A., Montreal, Que.

HUB MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
Perrin & Company, Wm. R., Toronto, Ont.

JOINTERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

KNIVES (Planer and others)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

LATHES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Defiance Machine Works.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.

LUMBER
Aberdeen Lumber Co., Pittsburg, Pa.
Acme Veneer & Lumber Co., Cincinnati, Ohio.
American Hardwood Lumber Co., St. Louis, Mo.
Anderson-Tully Co., Memphis, Tenn.
Banning, Leland G., Cincinnati, Ohio.
B. C. Lumber Commissioner, Toronto.
Brown & Company, Geo. C., Memphis, Tenn.
Churchill, Milton Lumber Co., Louisville, Ky.
Clark & Son, Edward, Toronto, Ont.
Dermott Land & Lumber Co., Chicago, Ill.
Dominion Mahogany & Veneer Co., Montreal,
Farrin Lumber Co., M. B., Cincinnati, Ohio.
Graves, Bigwood Company, Toronto, Ont.
Hartzell, Geo. W., Piqua, Ohio.
Huddleston, Marsh Mahogany Co., New York.
Long-Knight Lumber Co., Indianapolis.
Paepcke Leicht Lumber Company, Chicago, Ill.
Pickrel Walnut Co., St. Louis, Mo.
Probst Lumber Co., Cincinnati, Ohio.
Read Bros., Limited, Toronto.
Shafer Lumber Co., Cyrus C., South Bend, Ind.
Stimson & Co., J. V., Owensboro, Ky.

MACHINE KNIVES
Canada Machinery Corporation, Galt, Ont.
Peter Hay Knife Company, Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

MITRE MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

MITRE SAWS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Simonds Canada Saw Co., Montreal, P.Q.

MULTIPLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Reynolds Pattern & Machine Co., Moline, Ill.

PANELS
Waetjen & Co., George L., Milwaukee, Wis.

PATTERN SHOP MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PLANERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PLANING MILL MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PRESSES (Veneer)
Canada Machinery Corporation, Galt, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Perrin & Co., Wm. R., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.

PULLEYS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Machinery Co. of America, Grand Rapids, Mich.

RED GUM LUMBER
Gum Lumber Manufacturers' Association.

RESAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

RIM AND FELLOE MACHINERY
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.

RIP SAWING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SANDERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Nash, J. M., Milwaukee, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SASH, DOOR & BLIND MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SAWS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Radcliff Saw Mfg. Company, Toronto, Ont.
Shurly-Dietrich, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Smith Co., Ltd., R. H., St. Catharines, Ont.

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The Carborundum Co., Niagara Falls, N.Y.

SAW SWAGES
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Machinery Co. of America, Grand Rapids, Mich.
Simonds Canada Saw Co., Montreal, Que.

SAW TABLES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SCRAPING MACHINES
Canada Machinery Corporation, Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass.

SCREW-DRIVING MACHINERY
Canada Machinery Corporation, Galt, Ont.
Reynolds Pattern & Machine Works, Moline, Ill.

SCROLL SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

SECOND-HAND MACHINERY
Cowan & Co., Galt, Ont.
Osborne & Sexton Machinery Co., Columbus, Ohio.
Petrie, H. W.
Wayne Machinery Co., Fort Wayne, Ind.

SHAPERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Whitney & Sons, Baxter D., Winchendon, Mass
Yates Machine Co., P. B., Hamilton, Ont.

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Schmidt, Walter K., Grand Rapids, Mich.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
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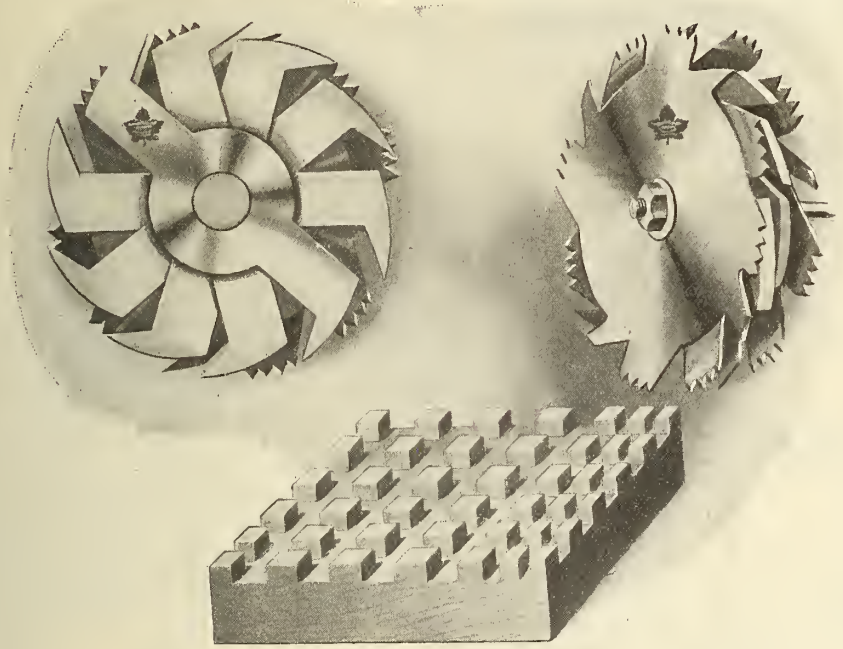

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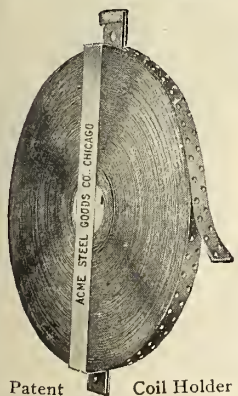

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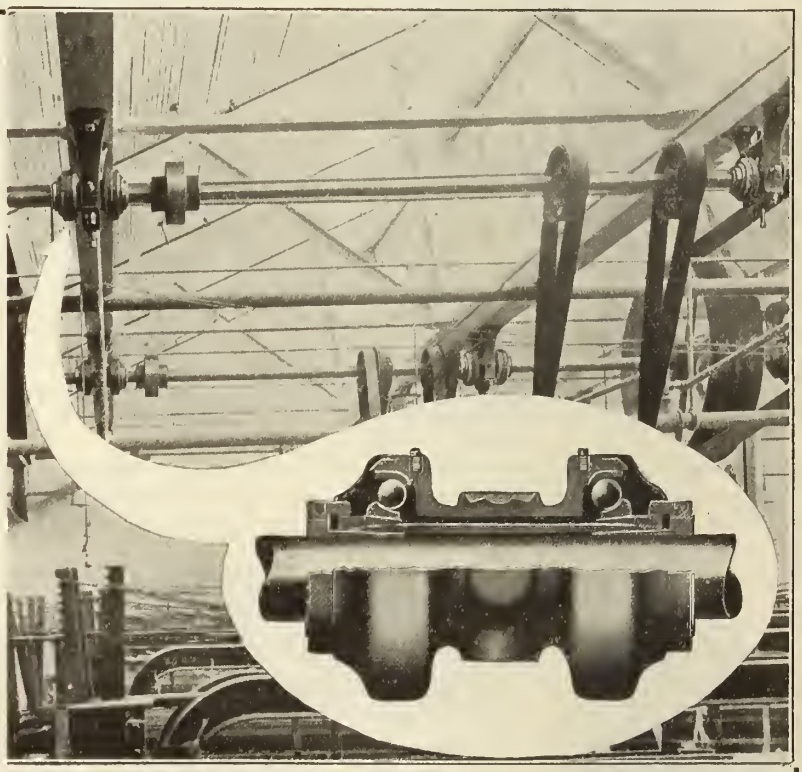

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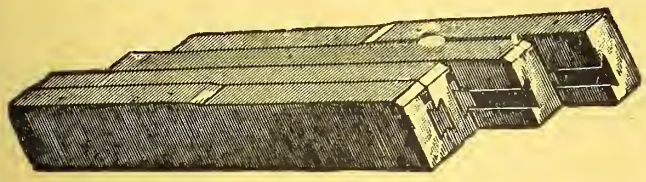

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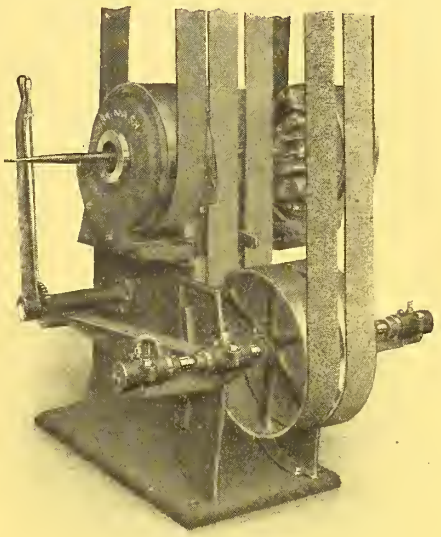

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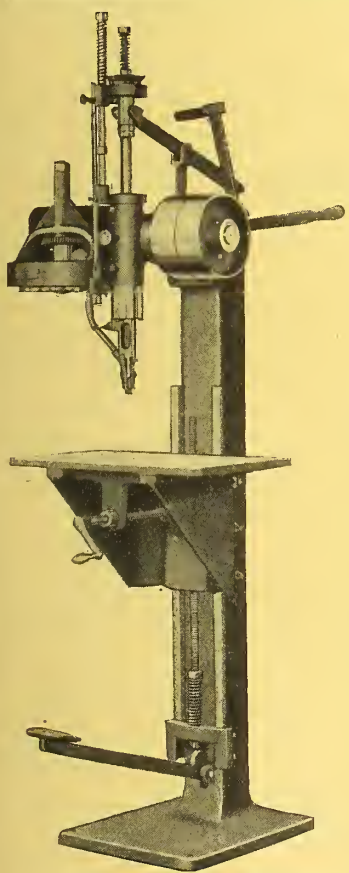

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If you are not using a hand-block sander of some kind, your cabinet makers must be sanding and scraping by hand; and if they are, 75 to 90 per cent. of the time thus spent is pure waste, because practically all of that finishing can be reached by the "138" hand-block sander, and the work accomplished five to ten times faster.

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Even though you have only work enough to keep this "138" busy one day a week, it is bound to pay big returns on your investment. The price is moderate — in fact, so low it will surprise you.

Send for our proposition. It's worth your consideration.

C. Mattison Machine Works

883 Fifth Street :-: BELOIT, WISCONSIN

Volume Seventeen TORONTO, APRIL, 1917 Number Four

CANADIAN WOODWORKER and Furniture Manufacturer

BETTER surfacing and faster work cannot be had outside of a

WHITNEY SINGLE OR DOUBLE SURFACE PLANER

The broad, clean, comprehensive statement we give you regarding Whitney Planers, when you signify your desire for facts, covers not only construction, operation, and cost of maintenance, but also the performance of Whitney Planers under the varied conditions met with in planing mills, furniture and box factories.

To obtain this information places you under no obligation.

We fully believe that Whitney planers are the BEST PLANING MACHINES made for rapid, smooth surfacing and lots of it, but—we assist you in comparing them with other planers so that the opinion may become mutual.

Your own opinion, formed by your investigation of facts will make you certain that buying a Whitney is your best move.

Whitney Planers are equipped either with square cylinder carrying two or four knives, or with round cylinder and four thin high-speed steel knives.

BAXTER D. WHITNEY & SON, Winchendon, Mass.

H. H. Plummer & Co.,
451-453 Monadnock Bldg., San Francisco, Cal.

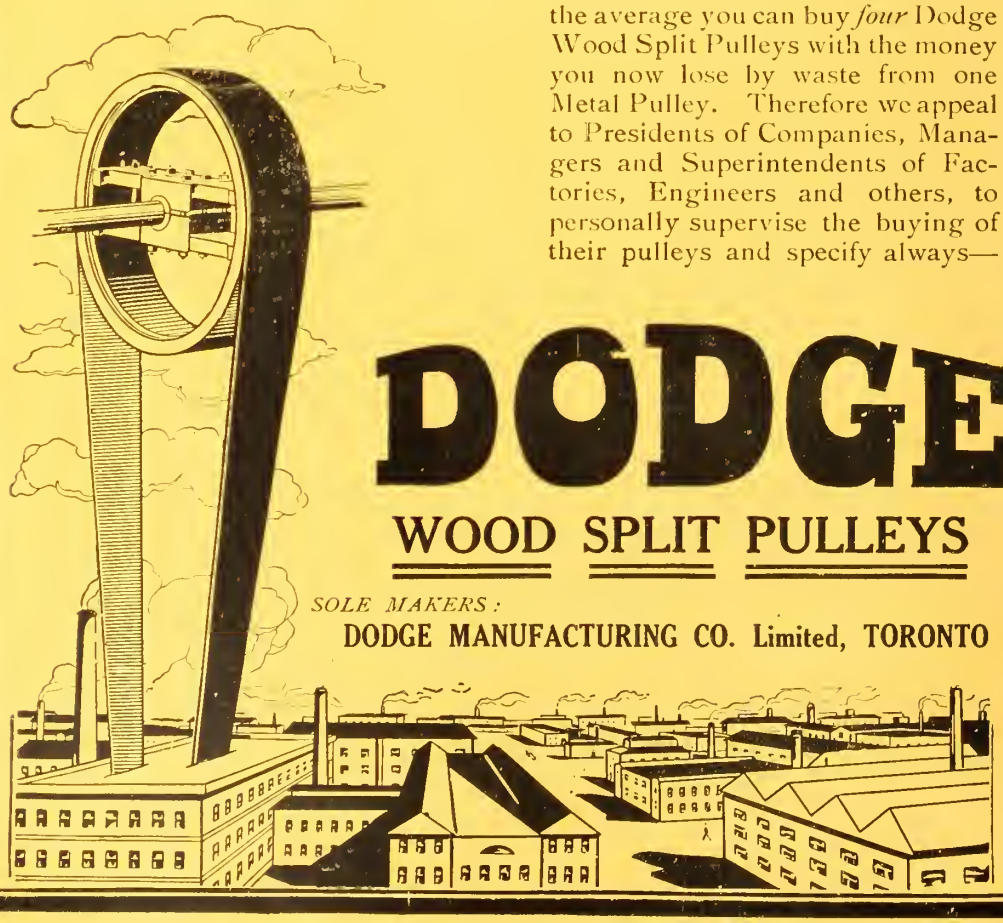
Canadian Representatives:
H. W. Petrie, Limited, Toronto, Ontario

Characteristics and Uses of Gum Lumber

That grim spectre—

RELENTLESS and ever present in Factory operation is the spectre of Overhead Charges.

Its ravages among the profits of your business must be constantly checked. One of its most active lieutenants is *Power Wastage* —caused by belt slippage over metal pulleys. Many thousands of dollars are wasted yearly in Canadian Factories and workshops where Wood Pulleys would save 50% of the waste.



Actual scientific tests show that on the average you can buy *four* Dodge Wood Split Pulleys with the money you now lose by waste from one Metal Pulley. Therefore we appeal to Presidents of Companies, Managers and Superintendents of Factories, Engineers and others, to personally supervise the buying of their pulleys and specify always—

DODGE

WOOD SPLIT PULLEYS

SOLE MAKERS:

DODGE MANUFACTURING CO. Limited, TORONTO

5

GARLOCK-WALKER MACHINERY CO. LIMITED

32 FRONT ST. WEST, TORONTO TELEPHONE MAIN 5346

Labor-Saving and Time-Saving Machinery

In all woodworking plants, under present conditions, up-to-the-minute LABOR-SAVING and TIME-SAVING machinery is an absolute necessity from a profitable business standpoint.

In no other way can the manufacturer so readily reduce the cost of his product without detracting from its quality.

We will on request, without obligation on your part, send cuts and descriptions of the latest improved machines for any operation. They give information that will be valuable for your files.

A List of Our Leading Woodworking Machines:

Band Resaws.
Band Rip Saws.
Band Edging and Ripping Machines.
Band Scroll Saws.
Bevel Band Saws.
Box Board Matchers.
Buzz Planers.
Box Machinery.
Boring Machines, Horizontal or Vertical, Single or Multiple Spindle.
Carving Machines.
Circular Saws, Rip and Cross Cut.
Combination Saws.
Cut-off Saws.
Dado or Grooving Machines.
Dovetailers.
Drum Sanders.
Endless Bed Sanders.
Furniture Graining Machines.
Filing and Setting Machines.
Gang Edgers and Rippers.
Glue Jointers.
Automatic Gang Rip Saws.
Hardwood Flooring Outfits.
Jointers, Power and Hand Feed.
Knife Grinders.
Lathes — Back Knife, Manual Training, Pattern Makers'.
Lath Mills and Bolters.
Lumber Registers.
Mitre Machines.
Mortisers — Hollow Chisel, Vertical or Horizontal.
Moulders—Inside or Outside.
Nailing Machines.
Planers—Endless Bed.
Planers and Matchers, light
Planers and Matchers, Fast Feed.
Rod and Dowel Machines.
Sanders, Drum, Disc, etc.
Shapers, Single and Double Spindle, with Babbit, Bronze, or Ball Bearings.
Sash and Door Outfits.
Screw Driving Machines.
Surfacers, Single or Double.
Swing Saws.
Timber Sizers.
Tenoners, Single or Double End.
Veneer Presses.
Variety Lathes.
Veneer Jointers.
Universal Saw Benches.
Wood Turning Lathes.

"EVERYTHING IN WOODWORKING MACHINERY."

Garlock-Walker Machinery Company, Limited
32 Front Street West, Toronto

METAL and WOODWORKING MACHINERY of all Kinds

THE COMPLETE LINE

Casters

Acme
Grip Neck
Ball Bearing
Non Ball Bearing
Metallic Bedstead
Piano
Philadelphia
Plate Ball Bearing
Victor
Truck
& Etc.

Period Trimmings

Drawer Pulls
Knobs
Escutcheons
Refrigerator Hardware
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& Etc.

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Band, Gang and Circular Saws

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Built in Sizes and Styles to Meet Every Requirement.

18,000 in use, or several times as many as any other make.

Write for Special Catalogue on Swages "F-2"

SOLE DISTRIBUTOR

MACHINERY COMPANY OF AMERICA

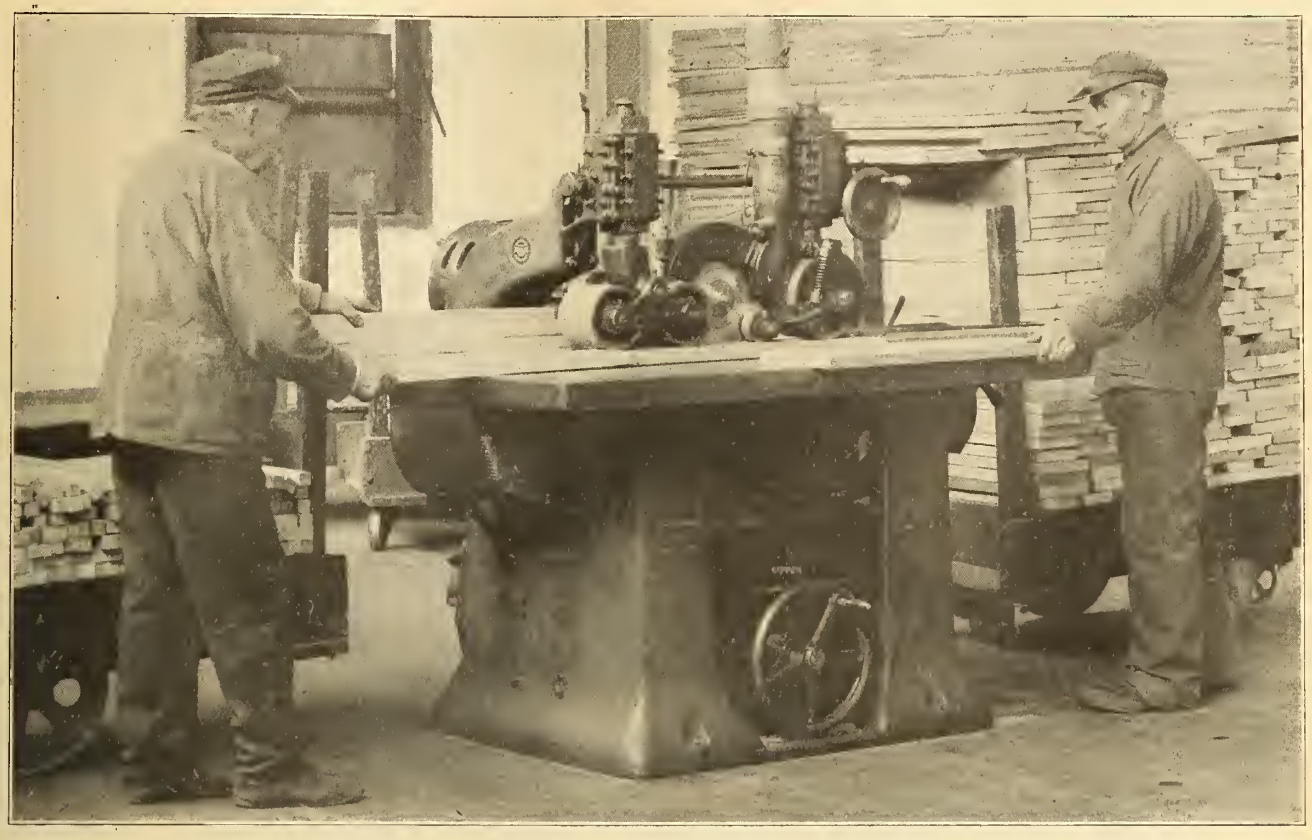
Everything for the Care of Saws — Grand Rapids, Michigan — *Everything for the Care of Knives*

DISTRIBUTORS FOR

BALDWIN, TUTHILL & BOLTON, COVEL MANUFACTURING COMPANY, HANCHETT SWAGE WORKS

No. 25 American Blue Book—Saw and Knife Fitting Machinery—now ready.

Write us your requirements. *Your correspondence invited.*



Is Your Factory Equipped to Save the Pennies?

WOODWORKERS everywhere agree that such equipment was never more necessary than right now. Manufacturing costs are gradually devouring the margin of profit. Savings of costs in **dollars** have all been made. Now, there is no hope of rescue for profit except in the **pennies.** Save the pennies and the **profits** will save themselves. It must be done, and there is no greater help than a

Yates (formerly BERLIN) *Type G-2 Edging and Ripping Saw*

It's Automatic Chain Feed carries stock unvaryingly past the saw with no attention other than inserting it under the infeed roll. Fast feeds enable it to manufacture from 40,000 to 70,000 lineal feet of lumber a day.

The rugged simplicity of its construction makes it unusually economical in upkeep costs. When given ordinary care, stops for repairs are unknown.

In addition, the Type G-2 can be operated successfully by the cheapest class of factory workers.

Haven't you an idea how the Type G-2 could save money for you? If you would know more of the uses and construction of this "life-guard" of your profits, send for our new circular G-2. It's free, with no "strings" attached.

P. B. Yates Machine Co. Ltd.

HAMILTON, ONT. CANADA

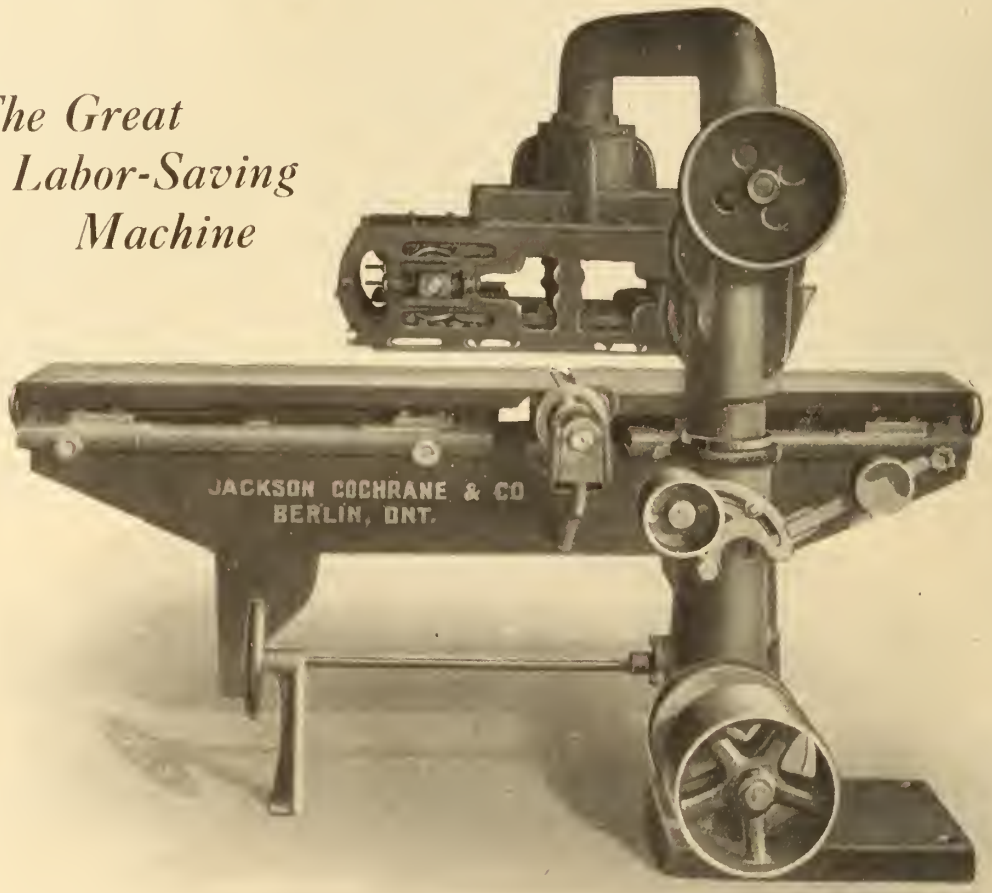
Beloit, Wisconsin, U.S.A.

Increase Your Capacity Four Times

by installing the

Herzog Swing-Out Jointer Attachment

The Great Labor-Saving Machine

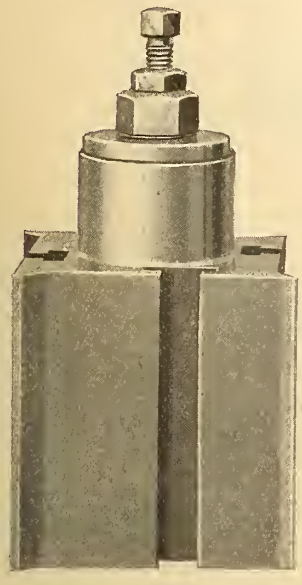


Our No. 38 Self-Feed Jointer Attachment, illustrated above, is especially desirable for factories that have but one or two jointers where it is desired to use it for squaring or edging, as the attachment can be quickly swung from the jointer. It does more and better work than four men can do with hand-jointing, can be operated by two boys, will handle stock from one inch wide to the full width of the jointer and produce perfect work. Stock can vary one-half inch in thickness without making any adjustment.

Ask for Bulletin

Jackson, Cochrane & Co., Kitchener, Ont.

Shimer Cutter Heads



Special attention at this time of the year is given by Lumber and Mill-men to the buying of Knives and Cutter Heads. Shimer Heads and Cutters are made of the best steel we can buy, and combined with careful manufacturing are the best Tools on the market.

Ask for prices on Square Heads, Matcher Heads and Sash and Door Heads.

SHIMER CUTTER HEAD CO. OF CANADA, LIMITED

GALT, ONTARIO

Successors to Samuel J. Shimer & Sons, Inc.

"Furniture in England"

This book is an encyclopaedia of artistic suggestion—an education in itself.

Upwards of 400 exquisite half-tone and color plates on pages 14 ins. x 10 ins.

Among the subscribers to this book are Her Majesty Queen Mary, His Majesty the King of Greece, and many of the foremost manufacturers the world over.

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Self-Balancing Cover Support

It is noiseless, the slightest touch moves the cover either up or down. Easily applied, and inexpensive.

SEND FOR SAMPLE.

Also of Tone Rods, Needle Cups, Needle Rests, Continuous Hinges

or

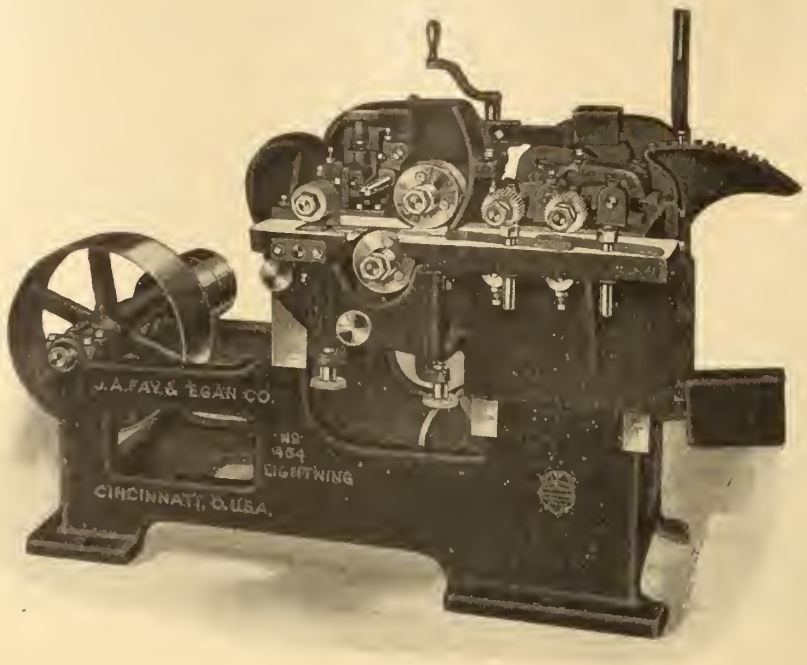
Furniture Hardware

in Period Designs

WE CAN MAKE DELIVERIES

Weber-Knapp Co.

Jamestown, N. Y.



A NEW MACHINE FOR MAKING PENCILS, SKEWERS, DOWELS, AND ESPECIALLY *FLAG STICKS.*

PENCILS — Stock of foreign made pencils, imported before the war, are exhausted—a new supply must be manufactured. This machine makes the wood part, round, hexaround or hexagon.

SKEWERS — Always in big demand—a good staple product—made on a No. 404.

DOWELS—More used now than ever—big demand for use in wood ship and small boat construction — No. 404 makes them.

FLAGSTICKS — Right now stocks are completely ex hausted—big demand unsatisfied—market will continue strong—No. 404 the only real flag-sticker made.

This is a new big production machine — Get one now—It will pay you well—Ask for Bulletin E-15.

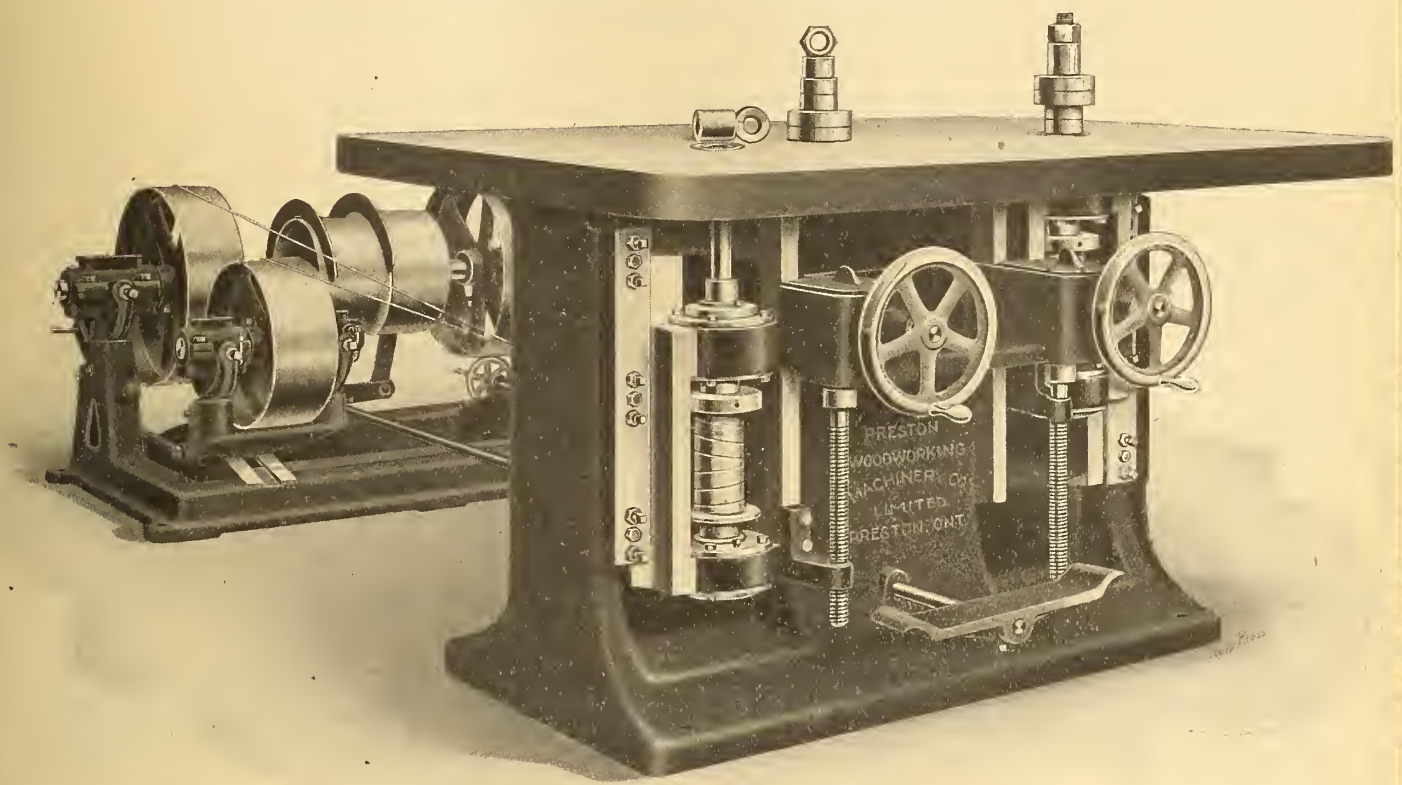
J. A. FAY & EGAN CO.

153-173 W. Front Street CINCINNATI, OHIO

"Treat your machine as a living friend."

Don't Waste Time

for which you are paying big money by having a Machine in your plant which is not giving you a maximum of production every day



No. 162 High-Speed Ball-Bearing Shaper

SEE THIS MACHINE!

It's built absolutely on honor, and will turn out 100% MORE WORK than the ordinary shaper which you are now using. That's our claim; twice the amount of work and much easier on the operator. Is it worth your while to cut your shaper cost in two? If so, drop us a line for more particulars.

THE CHEVROLET MOTOR CO. ARE USING 6 OF THESE MACHINES IN THEIR PLANT AT OSHAWA

DIMENSIONS, WEIGHTS and SPEEDS

Floor Space, 120 in. x 58 in. Net Weight, 2650 lbs. Shipping Weight, 2750 lbs. Tight and Loose Pulleys on Countershaft, 10 in. x 6 in. Driving Pulleys on Countershaft, 18 in. x 5 in. Idler Pulleys, 14 in. x 5 in. R.P.M. Countershaft, 1200. Pulley on Spindle, 3⅛ in. x 6 in. R.P.M. Spindle, 7000. Diameter Spindle, 2 3/16 in. Spindle Centres, 28 in. Table, 58 in. x 41 in. Diameter Spindle Top, 1¼ in. Horse Power Required, 3. Front Projection, 17 in. Height, 35 in.

"The Machine you want in your plant is not the cheapest machine to buy but the machine that will save you the most money to use."

The Preston Woodworking Machinery Co. Limited, Preston, Ont.

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Edward Clark & Sons

Toronto

CANADIAN HARDWOODS—winter cut **Birch, Basswood, Maple**

Ontario and Quebec Stocks, East or West, rail or water shipment direct from mill to factory.

Let us quote you on bored diaphragms for Bethlehem boxes, interlocking style, guaranteed to meet Imperial Munition Board requirements.

We Commend to Your Notice:

Our lumber is reliable, our grades uniform, our shipments prompt, and receive personal supervision; our prices consistent. We have had long experience. We desire to serve.

We Have Complained

to the Editor of this publication that the ad. we've been running hasn't brought satisfactory results. He says, "Be more specific in your offerings," so we act upon his advice :

We Have Ready for Immediate Shipment

550,000 ft. 1/28″ sliced African Mahogany veneer
1,600,000 ft. 1/28″ sliced Mexican Mahogany veneer
100,000 ft. quarter-sliced Am. Walnut veneer
200,000 ft. half-round cut Am. Walnut veneer

All of our own manufacture, of good widths and lengths, ranging from plain to the finest figured.

Are You Ready to Look Over Our Samples?

HUDDLESTON-MARSH MAHOGANY CO.

2254 Lumber St., CHICAGO **33 W. 42nd St., NEW YORK CITY**

We Have IT—
Soft Texture White Oak

150,000 Ft. 1″ 1 & 2 PLAIN WHITE OAK, bone dry, band sawed fine stock. Can ship immediately as all Canadian embargoes now lifted from our mill. Write ADAM KLIPPERT for prices on this or any other Hardwoods.

QUARTERED WHITE OAK, WALNUT, ASH, MAHOGANY, CHERRY, ETC.

Canadian Representative:
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11 Laxton Ave., TORONTO
Phone Parkdale 1354

LELAND G. BANNING
CINCINNATI, OHIO

Saint Francis Basin Band Sawed Oak

Soft Textured, Evenly Colored, Red and White

Place your orders now, so when embargoes are temporarily lifted we can get some stock in transit and put our Traffic Department to work for you.

We are Headquarters for

St. Francis Basin Kraetzer Cured Gum

Send us a list of your requirements. — Delivered Prices will be cheerfully quoted.

GEO. C. BROWN & CO.

Mill—PROCTOR, Ark. **Main Office—MEMPHIS, Tenn.**

We specialize in Tennessee Aromatic Red Cedar

RED GUM

("AMERICA'S FINEST CABINET WOOD")

Before RED GUM became recognized as a cabinet wood which manufacturers are proud to use and to tell about, and which *consumers* are proud to own, a good many high-class furniture manufacturers were obliged to call RED GUM by some sort of pretty nickname.

NOW ALL THAT IS CHANGED

The RED GUM producers have spent (and are still spending) thousands of dollars to tell the public that RED GUM is not only "America's most winsome wood," and *a thoroughly reliable wood* when properly manufactured, but also that to have a suite of "Genuine American RED GUM" in one's home is a *fact to boast of.*

As the public is being continuously educated to CALL FOR RED GUM BY NAME, isn't it good policy for all furniture manufacturers who make RED GUM furniture to call it by its RIGHT NAME and nothing else? Isn't it GOOD BUSINESS to do so? If they *don't, what will they say* when the public ASKS for "REAL RED GUM?" Are we right?

Write us for samples, particulars and general information.
Our reply will be prompt, personal and dependable.

GUM LUMBER MANUFACTURERS' ASS'N

1314 Bank of Commerce Building, Memphis, Tennessee

CHICKASAW LUMBER COMPANY

Oak, Gum, Poplar, Ash, Cottonwood, Tupelo, Magnolia

Hardwood and Cypress Lumber

Longleaf Flg., Dimension Shortleaf Siding, Partition and Finish

We make a Specialty of *GUM* Plain and Quartered

They can all say what they please about their stock, but—
"If it's Chickasaw, it's right."
DEMOPOLIS, ALABAMA, U. S. A.

We Make One Car Sell Another

In our prices we endeavor to strike a reasonable average, and in our grades maintain a high standard.

Churchill Milton Lumber Co.

Louisville, Ky.

We carry at
NEW ALBANY, IND.

Genuine Indiana Plain and Quartered Oak, Poplar

At GLENDORA, MISS.

Cypress, Gum, Cottonwood, Oak

SEND US YOUR INQUIRIES

We have dry stock on hand and can make quick shipment

BLACK WALNUT

Large Stock 1 to 3 inches thick ready for immediate shipment

also

Well Assorted Stocks of

West Virginia & Kentucky

OAK

Ash, Maple, Hickory, Chestnut, Basswood and Poplar

Prices and stock list on request

Burns & Knapp
Lumber Company
CONNEAUTVILLE, PA.

American Hardwood Lumber Co.

St. Louis, Mo.

Large stock of—

Dry Ash, Quartered Oak Plain Oak and Gum

Shipments from — NASHVILLE, Tenn., NEW ORLEANS, La., and BENTON, Ark.

Dry Spruce and Birch

Good Stocks, Prompt Shipments, Satisfaction

C. A. SPENCER, Limited

Wholesale Dealers in Rough and Dressed Lumber

Offices—500 McGill Building
MONTREAL - - Quebec

Dermott Offers You, Mr. Buyer:

QUARTERED WHITE OAK

3 cars 1 in. firsts and seconds.
1 car 1¼ in. firsts and seconds.
2 cars 1½ in. firsts and seconds.
1 car 2 in. firsts and seconds.
5 cars 1 in. No. 1 common.
2 cars 1¼ in. No. 1 common
1 car 1½ in. No. 1 common.
1 car 2 in. No. 1 common.

PLAIN WHITE OAK

10 cars 1 in. firsts and seconds.
4 cars 1¼ in. firsts and seconds.
2 cars 1½ in. firsts and seconds.
2 cars 1¾ in. firsts and seconds.
5 cars 2 in. firsts and seconds.
½ car 2½ in. firsts and seconds.
½ car 3 in. firsts and seconds.
5 cars 1 in. No. 1 common.
2 cars 1¼ in. No. 1 common.
1 car 1½ in. No. 1 common.
3 cars 2 in. No. 1 common.

PLAIN RED OAK

4 cars 1 in. firsts and seconds.
1 car 1¼ in. firsts and seconds.
1 car 1½ in. firsts and seconds.
5 cars 1 in. No. 1 common.
1 car 1¼ in. No. 1 common.
1 car 1½ in. No. 1 common.

PLAIN RED GUM

5 cars 1 in. firsts and seconds.
2 cars 1¼ in. firsts and seconds.
1 car 1½ in. firsts and seconds.
5 cars 1 in. No. 1 common.
2 cars 1¼ in. No. 1 common.
2 cars 1½ in. No. 1 common.

SAP GUM

7 cars 1 in. firsts and seconds.
2 cars 1¼ in. firsts and seconds.
2 cars 1½ in. firsts and seconds.
1 car 2 in. firsts and seconds.
5 cars 1 in. No. 1 common.
1 car 1¼ No. 1 common.
1 car 1½ in. No. 1 common.
1 car 2 in. No. 1 common.

Will be pleased to name you prices on any items in Southern Hardwoods. If you require well-manufactured stock, containing good widths and lengths, we can serve you.

DERMOTT LAND & LUMBER COMPANY

General Offices 1559 Railway Exchange Bldg. CHICAGO, ILL.

Band Mill and Yards—DERMOTT, Ark.

Long-Knight Lumber Co.

Manufacturers and Wholesale Dealers

INDIANAPOLIS, IND., U. S. A.

HARDWOOD LUMBER

Walnut, Mahogany and American Walnut Veneers

SPECIAL:

5 cars 5/4 1 & 2 Pl. Red Oak

FOR SALE

Black Walnut

Dimension Stock

5,000 feet 1 in. x 4 in. and up wide, 66 in. long.
5,000 feet 1 in. x 4 in. and up wide, 60 in. long.
10,000 feet 1 in. x 4 in. and up wide, 54 in. long.
20,000 feet 1 in. x 4 in. and up wide, 48 in. long.
5,000 feet 1 in. x 4 in. and up wide, 42 in. long.
10,000 feet 1 in. x 4 in. and up wide, 36 in. long.
25,000 feet 1 in. x 4 in. and up wide, 30 in. long.
20,000 feet 1 in. x 4 in. and up wide, 24 in. long.
15,000 feet 1 in. x 4 in. and up wide, 18 in. long.

The above is all Band Sawn and nicely equallized stock, all clear, and dry. Can ship mixed cars to suit your requirements. Write for prices on this stock, as well as anything else in Walnut Lumber Dimension Stock or Veneers that you may need.

Geo. W. Hartzell

Piqua, Ohio

RED AND SAP GUM

Manufactured by

The Hyde Lumber Co.

South Bend, Indiana

always gives satisfaction

Try Our QUALITY and SERVICE

Modern Band Mills and Kraetzer Preparator — Lake Providence, La.

Represented in Canada by

Charles O. Maus

TWENTY YEARS OF SQUARE DEALING IN HARDWOODS

Manufacturers

Mississippi Mills

Plain Oak — Red Gum
Quartered Oak — Sap Gum
Cypress — Cottonwood

Missouri Mills

Soft Maple — Soft Elm
Tupelo — Oak Dimension

West Virginia Mills

Plain Oak — Poplar
Chestnut — Oak Dimension

The KORN-CONKLING CO.
Head Offices—CINCINNATI, OHIO

J.V. Stimson & Co.

OWENSBORO, KENTUCKY

Manufacturers of

BAND SAWN HARDWOODS

QUARTERED and PLAIN OAK
ASH
POPLAR
HICKORY
WALNUT
QUARTERED SYCAMORE

OAK and WALNUT OUR SPECIALTY

"Gum of Quality"

Yazoo River Red Gum

As produced by

Thomas & Proetz Lumber Company

3400 No. Hall St. St. Louis, Mo.

is carefully manufactured; soft in texture; dark, rich in color; and admirably suited for furniture and interior trim.

Mills—Belzoni, Miss.; Catchings, Miss.; Naples, La.

If you are not buying from us; write today.

Anything in—

AMERICAN BLACK WALNUT

Square Veneers and Lumber for the Furniture Trade

LET US HAVE YOUR INQUIRIES.

Pickrel Walnut Co.

ST. LOUIS, Mo.

Crating Lumber

5/8" and 1" All Grades
At Right Prices

Try Us—It will be worth your while.

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Toronto -:- Canada

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Owen Sound, Ont.
Manufacturers of
"Well-Made" Wood Specialties
Toys, Games, Turned Goods and Kitchenware
We Specialize on
CUSTOMS TURNINGS
Your order will receive prompt attention

MAHOGANY
of
CHARACTER

M B

Martin-Barriss hardwoods offer something new in the way of service. This is particularly true of our thoroughly kiln-dried mahogany. If you require mahogany of character, possessing any particular figure, we are prepared to cut into log after log to obtain that figure.

Ask us about our service and prices

The Martin-Barriss Co.
Cleveland, Ohio

The Atlantic Lumber Co.

Manufacturers

Strictly Soft Textured

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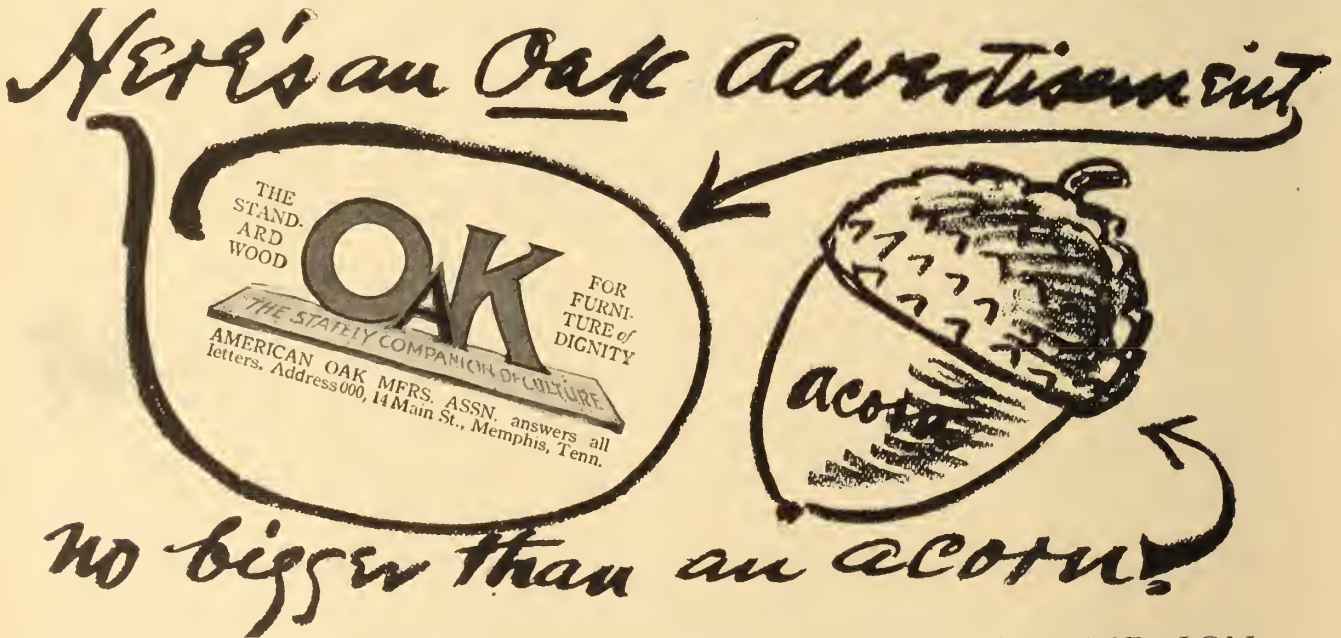
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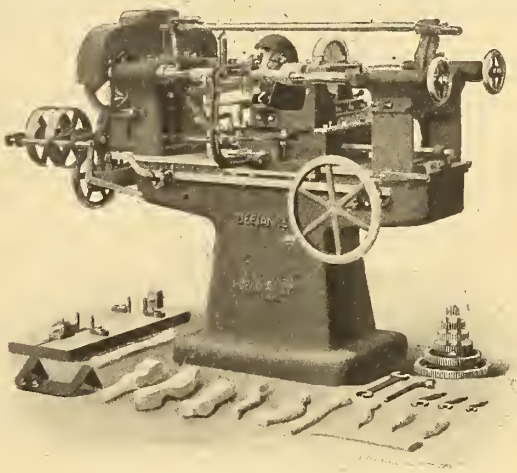

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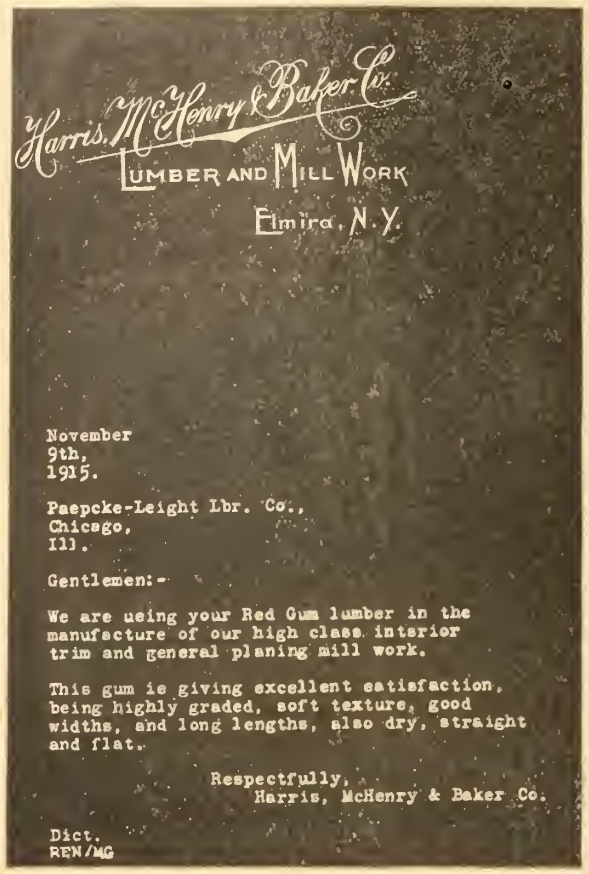
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LUMBER AND MILL WORK
Elmira, N.Y.
November
9th,
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Paepcke-Leight Lbr. Co.,
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Dict.
REN/MG

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Reaches the factories producing interior finish, doors, sash, flooring, woodenware, furniture, pianos, boxes, and general mill products.

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Vol. 17 April, 1917 No. 4

May be Demand for Shrapnel Boxes

The new developments on the Western battle front in Europe are evidently having some effect on the shell box business in Canada. We are informed by a party closely in touch with the situation that the Munitions Board is cancelling orders for 8 inch and 9.2 inch boxes wherever possible. Our informant is of the opinion that the Board is about to switch on to shrapnel boxes again, this latter kind of ammunition having been made necessary through the change in the character of the fighting. For many months now the fighting has been confined almost exclusively to trench warfare. The ammunition used has been almost entirely of the heavy types. Exceedingly large quantities were necessary on account of the British method of concentrating their fire on certain areas and literally pounding the enemies' trenches to pieces.

It is to be expected that the heavy ammunition will still continue to be used where bombarding is necessary, but the demand for the lighter shells will probably be huge now that the Germans are on the move.

Shortly before the recent reported action of the Munitions Board in cancelling orders for 8-inch and 9.2 boxes new drawings and specifications were issued for both of these boxes to be made entirely of hardwood, with 1½-inch diaphragms. (We expect to be able to publish drawings of these boxes in our next issue). We are also advised that the Munitions Board are at present considering the advisability of making a hardwood Bethlehem box. Manufacturers differ in their opinion as to whether such a box would be any improvement on the type already being made. One manufacturer spoken to ventured the opinion that if the hardwood box is adopted, trouble will be experienced. He states that the first difficulty will be to secure the hardwood, as this commodity is decidedly scarce at the present time.

The Munitions Board let contracts during the second week of April for between 700,000 and 800,000 Bethlehem boxes. As yet we have not learned whether any of these are to be hardwood boxes. We do not believe it is the intention of the Munitions Board to lay down any hard and fast rule about making the hardwood box. We are inclined to think it will be optional as long as the boxes are made according to approved specifications.

Feature Numbers

Gum lumber is being used rather extensively in Canada in the manufacture of furniture, and in smaller quantities for interior trim. For this reason, following out our usual custom of giving our readers authoritative information, we have published a number of articles in this issue, in which gum lumber is discussed from various angles.

In our May issue we will feature the subject "Steam Power Production and Transmission," and in the June issue "British Columbia Woods for General Woodwork and Furniture."

Essential to Know Costs

In an address to the National Foreign Trade Congress at Pittsburgh, Pa., recently, Edward N. Hurley, chairman of the Federal Trade Commission of the United States, made the following statement:—"I predict that within five years there will be very little money loaned by any banker in the United States to any merchant or manufacturer who does not present a statement showing detailed information, not only regarding his true assets and liabilities, but also indicating that he is conducting his business in an efficient manner and that he absolutely knows his true costs."

Undoubtedly Mr. Hurley's prediction will prove true, but it will not only be the United States bankers that will demand such information. The demand will be made in every place where enlightenment on business principles has penetrated. The day of slipshod methods in business has passed.

Gum Lumber Manufacturers' Association

Membership List

Alexander Bros., Belzoni, Mississippi.
Alexandria Cooperage & Lumber Co., Alexandria, Louisiana.
Anderson-Tully Company, Memphis, Tennessee.
Archer Lumber Company, Helena, Arkansas.
Barr-Holaday Lumber Company, Greenfield, Ohio.
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Kraetzer-Cured Lumber Company, Cincinnati, Ohio.
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Long-Bell Lumber Company, Kansas City, Missouri.
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Rotary Gum Association Department

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Forrest City Veneer Company, Forrest City, Ark.
Augusta Veneer Company, Augusta, Ga.
Cotton Plant Veneer Company, Cotton Plant, Ark.
Sumter Manufacturing Company, Livingston, Ala.

GUM LUMBER

Its Adaptability for Furniture and Interior Finish—Methods of Piling and Kiln-Drying

In the articles appearing in this issue Gum lumber is discussed in all its phases. Practical men tell what has been accomplished with it in the manufacture of furniture and interior trim. Illustrations show some handsome results obtained.

Two important features brought out and discussed are the necessity of proper piling and drying. A writer tells how lumber should be stacked on kiln cars; how to test for moisture and what moisture the lumber should contain.

We believe our readers will find it well worth their while to read these articles.

A Discussion of the Popularity of Red Gum by J. B. Crosby

The sudden rise to popularity of red gum has been one of the most striking and significant developments in the recent hardwood history of America—striking because of the rapidity with which new uses have been found for red gum (and its twin brother, sap gum). While we have been delving into the remote forests of other countries looking for mahogany, Circassian walnut, and other fine cabinet woods, we have been typically American in our prodigality with one of the most beautiful woods in the world that is growing in our lumber "backyard." As beautiful as mahogany, as strong and durable as oak, and as workable for utilitarian purposes as common pine or poplar, red gum is fast coming into its own. It "arrived" in Europe many years ago. England, Germany, and France have long been using red gum under such stage names as "satin walnut," "hazelwood," etc.

With the assistance of a modest amount of united and intelligent advertising, officially sanctioned by some of the more resourceful and far-sighted of the gum manufacturers, and now efficiently carried on by the Gum Lumber Manufacturers' Association, this wood has cast aside its aliases. It is now rapidly becoming one of the most popular, all-round, every-purpose woods known to architecture, building, and the furniture trade. Furniture dealers and furniture manufacturers are advertising red gum under its own name and are as proud of it as its users and owners. It has the rich, warm, brown tone that has made Circassian walnut so popular for furniture of the better class. At half the price of this wood and mahogany, red gum has all of their virtues and adornments. With the increasing price and decreasing supply of some of our other popular hardwoods, red gum and sap gum will in the next few years make even greater strides than in the past five or six. Red gum is one of the commonest of our Southern trees, and to this fact it owes its long neglect. Red gum has been characterized as the most misunderstood and most abused wood grown in the United States.

For many years it hung around the outskirts, being looked upon as an outcast. Occasionally small quantities were cut and used for temporary work or were used locally in the construction of cheap buildings. Everyone acknowledged the beauty of its figure and color, but since no one had taken the trouble to study its proper handling and cure, the verdict had been rendered that red gum was treacherous; that it would warp, twist, curl, and otherwise disport itself in an unseemly manner. Nothing could be more untrue if gum is treated right. An increase in the demand for lumber, coupled with a decrease in the supply and an advance in the cost of the preferred woods, enabled skillful advertising (of a kind never before attempted) to direct the attention of consumers to red gum. It was a wood known to grow in abundance throughout the Southern States. It could be had in any quantity desired, at a very low cost, and the trees would produce two to four logs of large size, practically free from defects. Nature had provided an ample supply of the raw material; man had put in mills and kilns suitable for the manufacture, and presumably the curing, of any kind of lumber. All

Office furniture and interior trim in Figured Red Gum.

that was required, then, to turn this forest waste into a commodity of great value was to evolve a method of overcoming the peculiarities in the physical make-up of red gum.

Forest Service Investigation

As public interest in the wood increased, the United States Forest Service took the matter up, and, after long investigation, found that the preparation of red gum for any purpose should begin when the tree is felled. To guard against staining and warping, it is handled in much the same way as other woods, but with the important difference that, when curing, the piles are narrower, so that the air may circulate freely, and thus prevent fermentation of the sap. It was also found that cross-sticks must be placed close together,

Matched Figured Gum Veneers present handsome appearance.

and that a double process of drying and curing is essential. Gum lumber has to be carefully piled and air-dried for one year after being sawed, and then kiln-dried. New gum weighs 4,750 pounds per 1,000 feet; air-dried for one year it weighs a maximum of 3,300 pounds, and gum lumber weighing more than 3 1/3 pounds per foot contains a stringent sap which causes warping. When this sap is thoroughly dried out, the results are unqualifiedly satisfactory. For any kind of interior trim, from cottage to palace, red gum is ideally adapted, as a long and growing list of buildings in any of the large cities will testify. The accompanying illustrations show what can be accomplished with figured red gum for interior work and furniture. Testimony as to the usefulness of red gum comes freely from practical and scientific men alike. Here is how a leading metropolitan manufacturer tells of his conversion:

"A few years ago we were very much prejudiced again red or sap gum, for the reason that our experience in handling that wood through our dry kilns and mill resulted very unsuccessfully. We would like to state that since the manufacturers have been able to handle and properly treat gum lumber after sawing it, we have become very much interested. The result is we have been able to handle this stock through our kilns and manufacture it in such shape that we were able to introduce it to various architects, owners, and builders, and even go so far as recommending it in finely-designed parquet flooring.

"We have gone further in experimenting with the sap gum, and our experiments have resulted quite favorably up to the present time. This wood will take the stain and varnish far superior to a good many of the domestic woods, which naturally shows a very beautiful effect."

Sap Gum for White Enamel Trim

Sap gum is said to be unqualifiedly the one best wood known as a base for the white enamel trim called for by the popular Colonial interiors now so prevalent. It has all the working qualities of any of the soft woods, and a number of others that the best of them never could claim. It takes glue, varnish, and paint perfectly, and is workable to a degree not attained by any other wood. And here is what one of the leading authorities on trees and forestry in the country said in a government bulletin:

"The red gum (liquidambar styraciflua) is a tree which is singularly free from fungus growth when compared with other species of hardwood trees. This comparative freedom from disease it shares with many other species of more or less ancient geological lineage. One of the reasons why the trees are so immune to the attacks of fungi may be sought for in the production of a kind of gum or resin which is present in almost all parts of the trees. The rosin appears as a yellowish-brown semi-transparent liquid, with a very bitter taste, in wounds and on the bud scales of our American species. It is commercially known as liquidambar or copal balm. Liquidambar forms and produces a similar tetebinthinous resin, and L. orientalis has a similar substance from which the storax, another resin largely used in China, is obtained. The principal reason for the comparative immunity from disease is probably the fact that in the course of its development from the early tortiary period up to the present time, a gradual elimination of those individuals which tended toward becoming diseased has taken place. In other words, the genus has been tending more and more toward becoming immune, because of the survival of such individuals as showed greater immunity to infection by fungi which tend to shorten the life of the trees. The present comparative freedom from serious disease is, therefore, probably to be explained by a simple process of natural selection which has produced a race almost immune, which gum shares with many other species of ancient lineage, such as the bald cypress, the redwood, and the sycamore. The heartwood of the red gum is comparatively long-lived when exposed to weathering influences. It has been used for a great many years in the construction of buildings, where it has served for foundation timbers, and in some instances in bridge construction. When thoroughly dried before being exposed, its length of life is comparatively great. Some instances are known to the writer where timbers of heart red gum have served as

Attractive doors and panelling of Figured Red Gum.

foundations in sawmills in Arkansas for fifteen years or more. Railroad ties have been made of red gum in the Mississippi Valley for a good many years, and have known a lasting power of from seven to eight years or longer. Even the sapwood, which, as will be seen, is very rapidly destroyed by fungi when in a green condition, can be made to last a long time. A cross-arm, one of the many made of red gum, has been in the service of an electric light line in Eastern Arkansas for eight years. The country in which these cross-arms are exposed has probably as hot and humid a climate as can be found. In spite of this, the timber shows practically no change after eight years' exposure."

Sap gum has followed closely the development of its more stylish relative and is not only much used by furniture manufacturers for frames or enamel work, but is rapidly coming to the front as a building and constructive wood. It has also been taken up with enthusiasm by builders of automobile and carriage bodies. An automobile manufacturer forced to use sap gum because poplar was not available soon found himself in possession of a new treasure, and he is now using it from choice, because he likes it better. There is no kind of carriage or vehicle construction that cannot make use of sap gum. Under the severe tests of continuous use by one of the largest vehicle manufacturers, sap gum has shown a low average of less than 1 per cent. breakage in bending. This is the best record ever made by any competing wood, the next lowest breakage in the case referred to being 9 per cent.

Whether "discovered," rediscovered," "reborn," or just well advertised, red gum and sap gum hold records for a rapid rise in general use and a steady hold on the affections and confidence of their users and workers.

The National Commercial Fixture Manufacturers' Association, which held its recent annual meeting at Baltimore, Md., decided to compile and issue a book giving complete information relative to the uniform plan of cost accounting which has been adopted by the organization. It will be issued in such a manner that it can be added to from time to time as fast as further information is obtained. As a part of its work the

Choice piece of Figured Red Gum.

association will in the future issue to its members uniform specifications for many standard articles, accompanied by tabulated information about the average cost of production, which will be compiled from reports furnished by the manufacturers.

What the Gum Association Has Done

By J. M. Pritchard*

One of the most interesting examples of the value of co-operation is furnished by the Gum Lumber Manufacturers' Association, which was organized three years ago with headquarters at Memphis, Tenn. The Association now has a membership composed of one hundred and fifteen of the leading gum manufacturers, and has become a power which has lifted gum to a leading place among the cabinet woods.

The Gum Lumber Manufacturers' Association has carried on a national advertising campaign, and in addition to this a scientific study has been made of the best methods of manufacturing, caring for and kiln drying gum lumber, all of which has resulted in overcoming all former objections to the use of this beautiful American wood, as evidenced by the fact that during the year 1916, there was more than 100,000,000 feet of gum used than in any previous year in the history of the industry.

Gumwood is probably adaptable to a greater variety of uses than any of the other native hardwoods, ranging from light weight fruit packages to the best grades of the richest colored and highly figured panels used in furniture, pianos and the most expensive and artistic architectural woodwork of all kinds. Two of the most important uses of red gum (heart wood of the red gum tree) are for furniture and interior trim. The effects that can be obtained by staining are varied and unusually attractive. Red gum finished natural is rapidly growing in favor among people of taste and refinement who prefer to exercise their own individuality and judgment rather than follow the dictates of historic bias. Figured red gum especially, with its ornate richness of stripes and variable color tones, yet with a character as soft and delicate as the sheen of fine satin, shows with unusual effectiveness that subtle, artistic quality which attracts but never tires the eye, and lends quality, dignity and grace to its environment.

Red gum (Liquidambar Stryraciflua) has a commercial range restricted to the moist lands of the lower Ohio and Mississippi basins and of the Southeastern Coast. These forests will furnish a supply of this wood for its many uses for years to come. The hardwood bottoms are for the greater part overflow land. The soil is alluvial and generally of a great fertility, and tree growth is for the most part extremely rapid. In the best situations red gum reaches a height of 150 feet, and a diameter of 5 feet. The stem is straight and cylindrical, with dark, deeply furrowed bark and branches often winged with corky ridges.

Commercially the term "red gum" applies to the heart wood of the red gum tree. In Europe this wood is known as red gum, satin walnut and hazelwood. Unselected gum, or sap gum, may be partially heart wood and partially sap wood or all sap wood. Unselected gum, or sap gum is often specified as hazle pine. Red gum is furnished in either plain or quarter-sawed lumber and veneer, as is the unselected, or sap gum. Red gum selected for figure can also be supplied in both lumber and veneer, and is now popularly known as "America's finest cabinet wood."

I am in receipt of letters from furniture manufacturers which state that the only objection they have to the use of red gum is its tendency to warp and twist.

Good Qualities of Red Gum

When all the good qualities of red gum are taken into consideration it would be difficult to calculate to what extent it would be called for if it had not been for the fact that originally it had been found to be a little refractory in the matter of seasoning. There was a time when manufacturers of gum lumber paid so little attention to the matter of caring for the lumber that it was generally put on the market in such bad condition that the furniture manufacturers formed a prejudice against it. Furthermore, the furniture manufacturers had given little or no thought to the matter of kiln drying gum, and as a result unsatisfactory experiences were had with the wood.

A careful study of the characteristics of this wood has, to a great extent, overcome this objection, and it is now being used in large quantities, both in the manufacture of furniture and for interior trim. In fact, during the last three years, since the Gum Lumber Manufacturers' Association began a general publicity campaign in behalf of red gum, its use has increased more than one hundred per cent. in our domestic markets, and at the present time it is the exception to hear a complaint against gum. This condition is due entirely to a better understanding of the wood, which begins with the lumber manufacturer and ends with the consumer.

The members of the Gum Lumber Manufacturers'

The Red Gum Tree in the forest.

*Secretary Gum Lumber Manufacturers' Association, Bank of Commerce and Trust Co. Building, Memphis, Tenn.

Residence of J. B. Utley, Evanston, Ill.—Red Gum for interior trim.

Association, by studying the best methods of manufacturing and caring for gum lumber, have learned how to pile it so as to keep it straight during the process of seasoning. They have also found that it is decidedly to their advantage to use great care in the shipments of gum lumber, so as not to put on the market lumber which will not work satisfactorily. On the other hand, there has been a scientific study made of the subject of kiln drying gum; this has brought out the fact that gum, instead of being a most difficult wood to kiln dry, is one of the easiest when properly understood.

The Forest Products Laboratory at Madison, Wisconsin, is at the present time making scientific tests for the Gum Lumber Manufacturers' Association, and later the results of these tests will be ready for publication. Preliminary tests which have been made have shown enough to justify the statement made that gum is really one of the easiest of our hardwoods to kiln dry, providing proper attention is given to piling and to the regulation of heat and moisture.

A great number of furniture factories, as well as other users of wood, have also made a study of how to kiln dry gum, and the results obtained by these concerns also verify the above statements. When gum is properly kiln dried, it will give no more trouble than any other cabinet wood. We believe the following hints will be of help in solving the kiln drying problem as related to gum:

Keep Lengths Separate

"The lengths should be kept separate, that is, 12-foot lumber should be piled on one truck, 14-foot on another, etc. Stickers should be placed directly over each other. There should be at least seven stickers to a 12-foot length. An air space of about two inches should be left between each board. From this point on through the kiln it is difficult, as already stated, to lay down an exact formula, but an experienced kiln man can successfully handle it, and it is safe to say that about the same methods should be employed as when drying birch lumber, care always being taken not to dry the lumber too fast. Many experienced men have told us that the maintenance of a high humidity in drying gum lumber is necessary for keeping the lumber straight, and drying the boards in the centre, as well as on the surface. The humidity should start about 90 per cent., and a temperature of 125 degrees, Fahrenheit. The condition when drying is completed should be a humidity of from 40 per cent. to 50 per cent. and a temperature of 175 degrees, Fahrenheit. After the lumber is thoroughly dry it is a good idea to take it from the trucks while it is hot and pile it in a solid pile on a firm foundation in a dry shed, and leave it for about ten days before using.

Another point worth consideration by manufacturers of furniture is the fact that, when the matter of kiln drying is solved, it costs less to work gum than most other woods. We have statements from reliable users of red gum that, in the manufacture of interior trim, they can save 20 per cent. in cutting gum over some other woods. This is due to the fact that gum is easily machined; the grain does not tear and it is easily smoothed. It comes in better widths and lengths than most other cabinet woods, and hence the waste in working is less. It is, therefore, decidedly to the advantage of furniture manufacturers, from a financial standpoint, to take up the use of this wood. Furthermore, red gum furniture is growing in popularity and it meets every demand, for it ranges from highly figured wood down to plain wood to suit the taste of all.

Methods of Using Gum Lumber

By Ewald Dierson

Few woods illustrate more pointedly than red gum the value of a thorough knowledge of the ways of handling them. This wood has been carefully studied by manufacturers because of the beauty of its grain and color and its many good properties. The fact that its likable qualities are intimately associated with some which are not so desirable increases interest in this material, because it has been found practicable to eliminate the objectionable features and accentuate those which are pleasing. To do this, however, requires knowledge in the art of handling.

As is well known, it was not many years ago that

View of living room, from reception hall, in J. B. Utley's residence.

red gum was unwelcome in any woodworking establishment in the country because nobody wanted to handle it. It was looked upon as too difficult to season, and too troublesome after seasoning. The beauty of the wood was well known, but there was such strong prejudice against it that a long time elapsed before anyone would consent to give it a fair trial.

The time came, however, when red gum forced its

way into popular esteem. It won on its merits in spite of the handicap of prejudice. The fact is, the way was shown by users of this wood on the other side of the sea who were more patient than the Americans, if not quicker to recognize the merits of the wood. Red gum was used in England, France and Italy by the best manufacturers long before it had any standing in the land that produced it.

The hardest problem to be mastered in this country was the seasoning. That trouble was finally overcome, and the results fully justified the effort. Many leading manufacturers now handle the wood, and some specialize on it, using it in their finest and most exacting work. It was formerly employed under names other than its own. It was passed as Circassian walnut, and it could be finished to imitate that wood so successfully that many a purchaser never could be made to believe that the wood was red gum.

The policy of calling it by some other name is now passing away. It stands on its own merits and under its own name. Fine buildings are being finished with it, in wainscoting, columns, beams and panels. The accompanying illustrations showing interior views of the residence of J. B. Utley, Evanston, Ill., afford an idea of what is being done with red gum. The milling was done by the Chicago Sash, Door & Blind Company, Chicago.

No wood could stay in its place or hold its shape better. There are various combinations, as an examination of the pictures show. There are panels, moldings and frames. Some of it is solid gum, an inch or more in thickness; some is thinner, yet solid, while some is veneer glued upon cores of other woods. All stands alike, all perfect, without a defect anywhere visible. No wood could present a more handsome appearance.

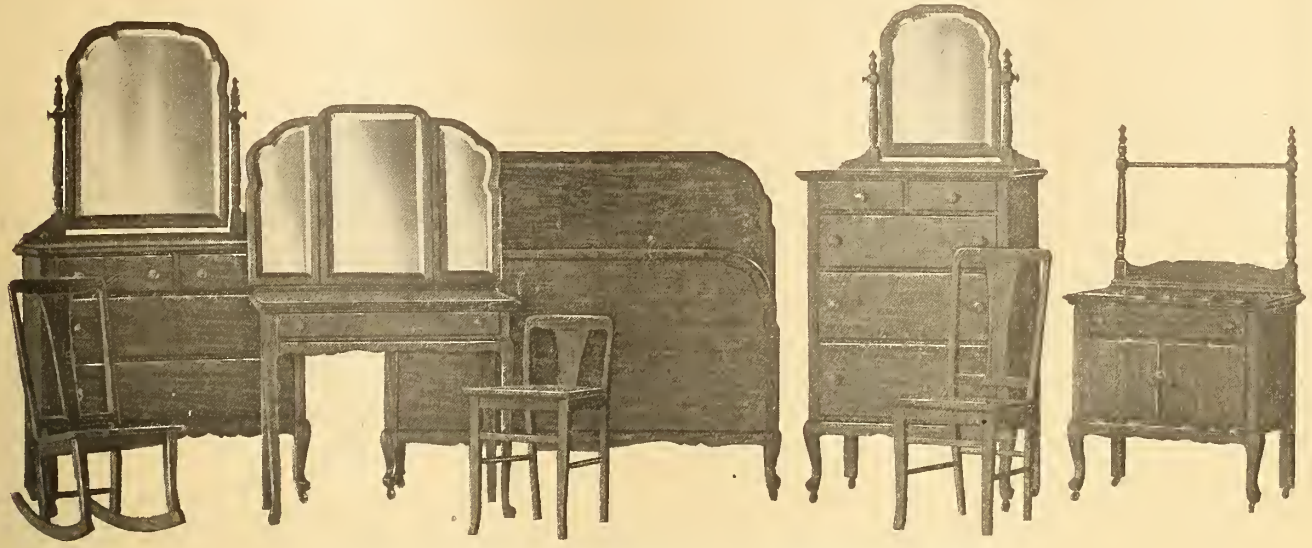
When it is desired to build up solid pieces, using inch lumber, it is preferred that the stock be quarter-sawed. This is not done for the purpose of increasing the beauty of the figure, though incidentally that result is often secured. The principal object is to obtain wood which will season straight and remain straight after it is seasoned. Experience indicates that this is more apt to occur with quarter-sawed stock than with the other, but it by no means proves that ordinary lumber may not also be finished and seasoned in the same way with equal safety.

It is well known that the red gum tree produces both sap lumber and heart wood. Some call the former "Saps" and the latter "Red Gum," though both are cut from the same tree. The writer's experience has been that when inch lumber is used for interior finish most satisfactory results follow the use of heart wood only. It is not claimed that sap may not be equally satisfactory under certain circumstances, but it is believed to be less dependable in seasoning.

When veneered panels are used adjacent to solid quarter-sawed work, it is customary to use quartered veneer also, in order that there may be uniformity in appearance. Such veneer is made by the slicing process, and it is cut from the bark to the heart. It may be cut very thin, because the wood is sufficiently tough to hold itself together.

When solid red gum is to be worked into cabinets and finish, the most careful inspection should occur before the work begins, because it is absolutely necessary that material be in proper condition before any cutting and fitting are done. If this matter is properly attended to there is no danger that the finished work will warp, twist, or pull apart. Unsatisfactory results in gum employed as interior finish are nearly always due to the fact that the wood was worked up before it was properly seasoned. This, of course, holds when the

Some pieces from the gum line of the Stratford Chair Company, Stratford, Ont.



Sap Gum suite made by The Knechtel Furniture Company, Hanover, Ontario.

right kind of stock has been selected, as well as in wrong selections. Everything must be right to begin with.

One of the accompanying pictures shows gum joinery in close proximity to the fireplace. That is a position which will try the standing qualities of any wood. The heat and dryness are excessive, and if joints do not pull apart there and panels warp or blister, they will not do so anywhere.

Moisture Content for Gum

By S. E. Saunders

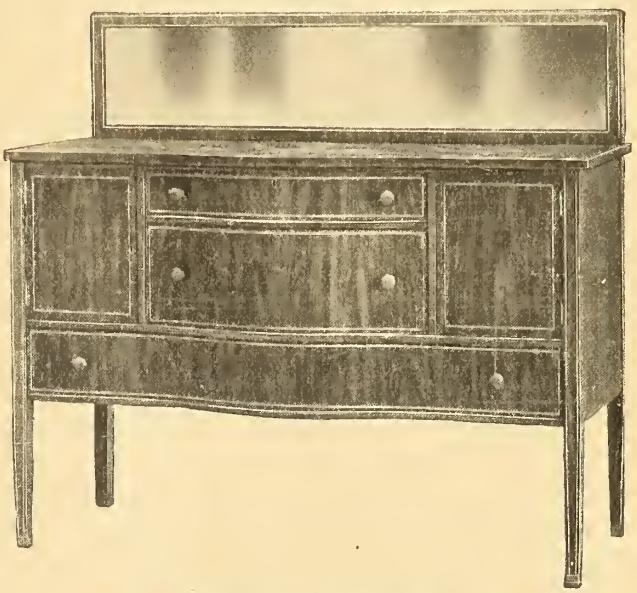
Gumwood as a cabinet wood is just beginning to rise from behind a cloud of trouble and show itself through a silver lining of quality for the manufacture of fine furniture. Mahogany and oak have been our most popular woods for furniture, because of the high quality goods in which they have been used, and also because of the fine finish it is possible to give them. Then again, they have always been before the general public as the only high class furniture woods.

Color has a great deal to do with the popularity of any wood used in furniture. Readers may recall the decline in the use of black walnut which occurred several years ago. The horrible black finish that it used to receive practically killed the wood for years. Now American walnut is given a beautiful brown color that harmonizes with the hangings, the rug colors and other furniture in the room.

Red gum has broken into the race and has given our finishers excellent opportunities to display their ability and produce for us many different colors that will harmonize in any room.

Red gum has so far been particularly favored for bedroom furniture, and to some extent for dining room pieces. In the bedroom it is particularly pleasing because of the character of the figure. With the distribution of gum that has already taken place among Ontario manufacturers, the writer believes this wood will continue to grow in popular favor as quickly as manufacturers learn how to handle it. It is now used in the very best designed furniture and finished in a manner that cannot help but popularize it. Circassian walnut is a first class wood, but I am firmly convinced that it offers nothing not embodied in the better grade red gum.

I will try and explain for the benefit of the intending user of gum a few points which I consider essential to procure results. Gum is a peculiar wood to dry and prepare for manufacture. This has been the sticking point with many of us, especially where we have not the proper kiln equipment. Gum wood should be "sticked" unsparingly in the yard until properly air



Inlaid Gumwood buffet in Sheraton design by the D. Hibner Furniture Co., Kitchener, Ont.

dried. Piles should be made narrow so as to ensure good free air passage. Sticks should be not more than 30 inches apart and in perfect line—one above the other. On account of the warpy nature of gum the more care taken in piling, the better results will be obtained in the factory. Use the same rigid precautions when loading for the kiln, allowing plenty of air space up centre of car and plenty of strips all of the

same thickness and 2 inches wide. A kiln truck poorly piled decreases the cutting results 25 to 40 per cent. Why? Because by the time the material is faced straight it is too thin; also, the long cuts are few.

The time required to kiln dry gum depends entirely upon its condition when it enters the kiln. Various types of dry kilns are in existence to-day with greatly varying degrees of efficiency. Every manufacturer should make a careful study of his kiln. An inefficient dry kiln can sometimes be remodelled at a very small cost, but space will not permit me dwelling longer on kilns. Gum wood should be thoroughly steamed upon entering the kiln. The humidity should be raised to at least 80 degrees. This softens the pores of the wood, and, as it were, boils any life there is in the wood out. As the car is passed through the kiln the humidity decreases gradually and the heat increases. This process for gum will average two to three weeks. The heat on outlet end of kiln should be between 150 degrees and 175 degrees F.

It is well to have trucks piled so that there will be a loose board in centre of load. This board is cut in two and a small piece taken from the centre for testing purposes. It should test not more than four per cent. moisture. If lumber is dry, run it out of kiln and let cool off in cooling shed before piling away or taking in for cutting. Now, let us suppose we are cutting plain red gum with a percentage of sap showing. I have in mind medium priced bedroom furniture, of which we are to cut 25 suites, say 10 for mahogany finish, 10 for enamel and 5 showing stripe for satin walnut, or natural finish. As the swing saw man is responsible for the sorting it would be his duty to allow a proper proportion of sizes and grades for each of the above mentioned finishes. If we are using quarter sawed red gum on the better grades of stock we use our best pieces on tops, table leaves, china cabinet shelves, etc. Quarter sawed gum does not warp and it gives us a rich ground to work on for either mahogany or walnut finish.

Gumwood is a comparatively easy wood to work. After it is properly prepared no further trouble ensues. In closing my few remarks, am I not right in saying that with gum several designs can be cut and offered either as "Gum Natural," imitation mahogany, Circassian walnut, enamel and even American walnut, all made in one cutting and subjected to the finishers' art.

Drying by the Vapor Process

By E. U. Kettle, Grand Rapids Veneer Works

So much has been written on the subject of kiln drying lumber that it is almost impossible to treat the subject comprehensively and escape the taint of plagiarism. In this respect the writer may but plagiarise the plagiarist,, for much of the kiln drying "dope" disseminated during the past ten years by the inventors of the vapor process kiln has been re-hashed, and in a more or less similar phraseology handed to the public by interested parties who proved the sincerity of their flattery by almost word for word imitation.

While there is nothing especially new presented herein, it is hoped that the information given may be of practical value to those for whom it is intended. Before describing the "modus operandi" of drying lumber by the vapor process it may be advisable to mention that the inventors and patentees of that process are practical woodworkers, operating one of the largest plants in the United States, and after having tried every known system of drying lumber, found it impossible to obtain the really satisfactory results, until after several years of research the vapor process was evolved by them.

As manufacturers of large size panels, table tops, etc., it was absolutely essential to dry the hardwood cores in such a manner as to ensure a minimum of shrinkage or expansion after drying. Now when we consider the difficulties of attaining permanence of dimension in lumber which undergoes such varied treatment as panel core stock, we can realize it is "some problem."

First comes the jointing, during which the water from the glue is absorbed by the wood at points of contact. As wood is highly hygroscopic this absorption of water causes expansion of the cell walls, and consequent expansion of the lumber. Following this, when the crossbanding is applied to the faces of the jointed panel, more water is absorbed, and further expansion ensues.

Assuming that the pieces of wood in the panel are not uniformly dried, that is to say, if any piece in the panel is either drier or wetter than its neighbor, further trouble may ensue, resulting generally in a wavy surface on face due to distortion of the core by unequal shrinkage, whilst open joints and interior checks further complicate matters. This simple illustration is sufficient to show the need for a drying process which will assure practical permanence of dimension after drying.

Perfectly dried lumber should be flat, of uniform moisture content, of approximately 5 per cent. over the so-called "bone-dry" or "constant-dry" condition, with exterior no harder than the interior, free from interior or exterior checks, with knots dried in firm, free from excess of acid, and with its natural tendency to expand or contract during variation of atmospheric conditions reduced to a minimum. To the certain knowledge of the writer the vapor process does dry lumber in such condition.

Although, at the request of the Editor this is written more particularly with the view of assisting users of gum lumber, the general principles of the drying process are universally applicable. They vary only in duration of time, the application of different degrees of temperature and percentages of relative humidity, according to the species, thickness, and moisture content of the lumber to be treated.

The inventors have never made any secret of their methods, as it has been conclusively proved that those methods can only be successfully applied in the down draft kiln specially designed and patented by them, and sometimes inefficiently pirated by others. When this process was first given publicity, quite a few people jumped to the erroneous conclusion that all that was necessary was a room equipped with radiators and a steam spray. Those who added a steam spray to their existing bake-oven kilns, of course, found it an improvement, so complacently announced "Eureka." Other honest gentlemen calmly annexed, or shall we say copied, the design of vapor process kilns installed elsewhere, but failed to achieve complete success, owing to the lack of knowledge of operation.

Others took no chances, but invested in a correctly designed installation, and to the surprise of the spray bake-oven adopters, and the honest gentlemen before

mentioned, proceeded to dry lumber without waste, and in about one-half the usual time required by their competitors. This was sufficient to convince many of the old-timers that there were other things to be taken into consideration than the mere addition of the spray. For instance, correct ventilation, incessant circulation of air in every part of the kiln and between the courses of lumber, control of temperature, percentages of relative humidity, the before mentioned circulation and ventilation, and last, but not least, correct method of operation.

A correct lumber drying schedule has been evolved from which the kiln operator can tell at a glance the exact conditions necessary for successful drying of any kind of lumber he has to handle. For instance:

Assuming that he is about to dry a kiln load of 4/4 inch gum of a moisture content of 20 per cent., he finds that the drying schedule gives the following formula:

1st day	120 degs. F. Temp.	100% humidity
2nd day	130 degs. F. Temp.	100% humidity
3rd day	145 degs. F. Temp.	90% humidity
4th day	150 degs. F. Temp.	80% humidity
5th day	155 degs. F. Temp.	70% humidity
6th day	160 degs. F. Temp.	60% humidity
7th day	165 degs. F. Temp.	50% humidity
8th day	170 degs. F. Temp.	40% humidity

Note that while the percentage of relative humidity gradually decreases, the temperature just as gradually increases. There are no abrupt variations, as a properly designed kiln is almost automatic in action. In giving above drying formula let it be distinctly understood that users of others than the vapor process adopt it at their own risk.

The writer has avoided technicalities so far as possible, and has simply stated how, in one particular instance, successful drying can be obtained by maintainence of correct air conditions in the kiln. The theory, proven correct in practice, is that before attempting to produce vaporization and evaporation of the moisture in the lumber, it is necessary to first equalize its moisture content, and uniformly heat it from surface to centre. In the case of air dried stock, this causes opening of the pores and expansion.

Now when evaporation commences the uniformly moist, and uniformly heated lumber gives up its interior moisture first, drying from the centre outward in distinct contradiction to other methods, whereby the outside dries first and to some extent seals in the central moisture; a prolific cause of interior checking and other defects. The comparatively high relative humidity of the kiln air keeps the surfaces from drying before interior moisture is evaporated, and thus when completely dried the fibres of the wood are uniformly set, and are therefore less liable to change of dimension through change of atmospheric conditions after drying. It is also obvious that the kiln shrinkage of lumber dried by such process is a negligible quantity.

There is a peculiarity about this process in connection with drying gum, or any other lumber which has dark colored heart-wood and light colored sap wood. Assuming that a kiln load contains a quantity of gum boards, which boards are not all heartwood, but contain heartwood and sapwood in one board, it will be found that during drying, by the vapor process, transfusion of color takes place from the heartwood to the sapwood. It is on record that a load of such mixed heartwood and sapwood boards was in a Grand Rapids factory graded as all heartwood (red gum), after treatment. On several occasions, the same transfusion of color has been noticed taking place in black walnut, which has a particularly dark colored heartwood, and a very light colored sapwood. It is apparent that this is a decided advantage to buyers of gum lumber.

In conclusion the writer would state that the vapor process is in operation in over 150 installations in Canada, is equally applicable for all kinds of lumber, and is the most economical system in service to-day.

Experiences in Drying Gum

By A. E. Krick, of The National Dry Kiln Co.

The drying of gum lumber is one problem which has vexed and perplexed a great many manufacturers. Hundreds who would otherwise have used thousands of feet of gum have passed it up because they either could not get dry lumber or could not successfully dry it themselves. Numerous devices have been invented to aid in drying gum. The steaming process is one that has been used a great deal, but with varying success.

One concern which has had a lot of experience in drying gum is the Holly Ridge Lumber Company, of Louisville, Kentucky, and Holly Ridge, Louisiana. A great deal of this experience has been poor. They have used the steaming process and have found it far from satisfactory. They have tried air-drying it for a long period, but were not able to get it very dry this way, on account of the high humidity of the Louisiana atmosphere.

A few months ago, Mr. E. B. Norman, President of the Holly Ridge Company, was induced to look at some kilns in operation at the plant of the Showers Brothers Company, at Bloomington, Indiana. Here he found that gum of all kinds and thicknesses was being dried successfully. He immediately became interested.

Last fall, Chess & Wymond Company, also of Louisville and Holly Ridge, purchased two National Compartment Kilns for drying oak at the Holly Ridge plant. On trial test, one of these kilns was filled by the Holly Ridge Lumber Company with 2-inch green gum lumber, right from the saw. It was assumed that about twenty-one days would be required to properly season it and dry it to cabinet dry. Consequently, the drying schedule of operation was made up on this basis.

This stock was dried in nineteen days and was in better condition than any gum that they had ever dried, whether green, air-dried or steamed when put into the kiln. It was straight and clean, free from checks or other defects. The staining so frequently encountered in other processes was conspicuous by its absence. The test was highly satisfactory.

The treatment of gum lumber in a National Kiln is entirely different from the treatment given it in any other type of kiln or by any other process. The application of heat in treating 2-inch gum is very gradual. Moisture and ventilation is applied proportionately in the manner prescribed by the manufacturer. The success of the kilns is sufficient evidence of the wisdom of following the process prescribed.

Careless work brings its just punishment in loss of work. Nobody likes a careless workman.

What Furniture Men Think of Red Gum

They Emphasize Need of Proper Stacking and Kiln-Drying—Good Results from Moist Air Kiln—Costs Less to Finish Than Other Hardwoods

That the unfavorable opinion which many furniture manufacturers formerly held against gum lumber is fast disappearing and that this wood is rapidly becoming established as a furniture material is evidenced by the following letters from Canadian manufacturers. With proper methods of drying and handling satisfactory results are obtained with gum lumber. Letters from producers of gum lumber indicate that these gentlemen realize the importance of giving their product every care and attention before it leaves their yards. Intending users of gum lumber will profit by a perusal of these letters, as they contain many valuable suggestions.—Editor.

* * *

Southampton, Ont.

Editor Canadian Woodworker.

We do not manufacture furniture from gum lumber, although we use considerable for back rails, back panels, and drawer sides. We have no trouble drying our gum. We use plenty of cross-sticks, both in piling lumber in the yard and while it is going through the dry kiln. We also dry slowly, and so far have had no trouble.

The Bell Furniture Company, Ltd.

* * *

Stratford, Ont.

Editor Canadian Woodworker:

We are not large users of gum lumber, and possibly are not in a position to speak with authority concerning difficulties met with in its manufacture as are some others.

However, we may say that we have used it in our line for several years, and have found it fairly satisfactory as a cabinet wood. It works easily, but, on the other hand, is just as easily marred. In our opinion, this is about its worst fault. It is so soft that it must be handled with the greatest care, else it will go out from the shipping department badly marked.

Of course, gum must be piled carefully in the yard to keep it straight and then carefully dried. In putting through the kiln, we find it will come out fairly straight if pains have been taken in piling on trucks. We strip about every 18 inches apart, and are careful to have strips a uniform thickness.

When the article is made up there is occasionally some difficulty from checking and warping, but, on the whole, if care has been taken with the lumber from the start, it does not give much more trouble in this respect than plain oak.

The Stratford Chair Company, Ltd.

* * *

Preston, Ont.

Editor Canadian Woodworker:

Regarding gum lumber, would say that we are quite large users of the wood. Unless you have a proper kiln for drying it, it is very unsatisfactory to work with. There is a lot of cross grain in it, and it warps and checks very badly. Sap gum is not so bad for this as the red part. However, with a steam process kiln a great deal of the difficulty can be overcome. Quarter-sawn stock does not have the same tendency to warp or check.

Whenever the drying process is overcome gum is a very desirable wood for furniture, and lends itself to various colors, such as walnut, mahogany, or natural gum. We have one suite which we make in figured gum, and we have found it very popular. But it is necessary to have nice figured wood or otherwise it would be useless.

Crown Furniture, Ltd.

* * *

Hanover, Ont.

Editor Canadian Woodworker:

We understand that there is a strong prejudice in some sections against furniture made of gumwood. On the other hand, we have had no trouble whatever with our gumwood lines. Our factory men like to work with gumwood; it takes an excellent mahogany or walnut finish, and, as we have said, we have had no complaints from our customers. Gumwood must be properly dried before it is fit to use. We air-dry our gum lumber for a year or more before using it, and when it goes into the dry kiln, special care is taken to see that the piles are well stripped. We believe that if gumwood is properly handled it is a most satisfactory wood to work, and there will be no trouble with the manufactured article warping or shrinking.

The Knechtel Furniture Company, Ltd.

* * *

Riviere-du-Loup, Que.

Editor Canadian Woodworker:

We have been manufacturing a little gum furniture for the last three years, and have had no trouble whatever in drying it. We purchase only the best red gum, dried, and we only put it a couple of days in our hot air (Sturtevant) dry kiln.

We have not been manufacturing any gum for the last five months on account of not being able to get the lumber into Canada. This is due to the embargo, and we do not know when we shall recommence.

We may add that gumwood is a very capricious lumber; the climate has a good deal to do with it. On damp days it may swell a little and on dry days the ends of the joints may break. We only finish our gumwood furniture when it is sold, and keep the goods in stock in the white, and if there are any checks we repair them before finishing. In this way our customers always get fresh goods.

St. Lawrence Furniture Company.

* * *

Kitchener, Ont.

Editor Canadian Woodworker:

We beg to say that we are using gum lumber right along, without very much difficulty from moisture, and there is no doubt that our kiln is responsible for this. We have a Grand Rapids moist air kiln, where the gum, upon entering, is thoroughly steamed with exhaust steam and then moved on rapidly through the kiln. We are glad to say that by the time it is dry and taken out it is absolutely flat. We have to stick it with six to seven sticks, however, and put on from six to eight rows of lumber on the top to keep it down; but when this is done there is absolutely no trouble.

The D. Hibner Furniture Company, Ltd.

* * *

Cornwall, Ont.

Editor Canadian Woodworker:

We manufacture gumwood furniture. Gumwood is harder to work than either mahogany or walnut, and there is a much larger waste to the veneers if you wish to get well-matched stock, as the figure or pattern often changes in one sheet of one-twentieth of an inch. The sheet has one figure

on one side and an entirely different figure on the other, which makes it hard to match.

Beach Furniture, Ltd.

* * *

Orillia, Ont.

Editor Canadian Woodworker:

We have used a small quantity of gum lumber in the past, but found that it requires a little special care in drying.

The Orillia Furniture Company, Ltd.

* * *

Suggestions from Producers of Gum Lumber

Cincinnati, Ohio.

Editor Canadian Woodworker:

It is our opinion that the increasing demand for gum lumber is owing to two things, the first being that the manufacturers have better learned how to make it and take care of it properly than they did in the beginning; the second is that the consumers have also learned better how to get proper results out of this wood. It is regarding the first of these two matters that we want to write.

When the sawmills first commenced to cut gum lumber in any quantity they didn't know how to cut it or take care of it. They have since learned that in order to produce a satisfactory article it has got to be made right and then be taken care of in the proper manner. It has been our experience that winter-cut gum is most satisfactory, because lumber made from logs that are cut up during that time show considerably less tendency to stain, twist, or check.

Gum lumber should only be piled on good foundations. The pile must have proper pitch to it, and a sufficient number of stacking sticks should be used. For instance, a 16-foot pile should have from seven to eight stacking sticks; other lengths should be in proportion. There also should be plenty of air space between the piles. Dry stacking sticks should be used. Gum lumber should never be piled in a yard in which there are tramways, because the lumber below the trams never dries out properly.

Satisfactory results cannot be obtained if thick gum is cut during the summer months, because it is bound to check entirely too much. The checking feature has been almost eliminated by quarter-sawing gum. The field for quarter-sawn stock is widening rapidly, and values are increasing, because quarter-sawn gum is worth more money than plain-sawn gum, and it costs more to produce it.

We believe that one of the most serious handicaps gum lumber has been under has been the name. "Gum" is not a name that seems to appeal to consumers, and we believe that that had a great deal to do with the tardy adoption of this wood for furniture purposes. The European consumers first learned the value of gumwood for furniture purposes. It was very seldom offered to them as gum, though red gum is known in England as "satin walnut" and sap gum as "hazel pine."

Thoman-Flinn Lumber Company.

* * *

Memphis, Tenn.

Editor Canadian Woodworker:

We have been manufacturing large quantities of gum the last few years, and are now manufacturing a product which has met with satisfaction in practically every market of the country. It is our opinion there is not a hardwood today in the country that is equal to gum as a cabinet wood, and gum represents by far the most economical purchase. There is more real value to be obtained, grade for grade, in gum than any other hardwood. Gum, properly handled, is as straight and free from warp and twist as any other wood.

In the finishing end we believe that gum can be finished at 20 per cent. less cost than any other hardwood. It is a well-known fact that in the woodworking department it can be worked up and handled much more satisfactorily.

We certainly believe that any manufacturer of hardwood products, such as furniture, interior finish, etc., who does not make a good line of gum is missing some very satisfactory business and profits.

George C. Brown & Co.

* * *

Greenfield, Ohio.

Editor Canadian Woodworker:

We have always considered gum a rather hard wood to dry in our yard so as to be perfectly flat and straight when in shipping condition. After some experimenting, we found that by leaving a sort of a chimney or air-chamber in the centre of the pile, a space of five or six feet between the piles, and the top of the foundation at least a foot and a half to two feet from the ground, that gum would become thoroughly air-dried in three to four months. In addition to this, we use plenty of stickers, so that the tendency to warp in the pile is eliminated.

Barr-Holaday Lumber Company.

* * *

South Bend, Ind.

Editor Canadian Woodworker:

In the manufacture of gum it is necessary to have level foundations and to use plenty of stickers if you wish your lumber to come through in good condition and straight. A great many of our customers require gum that is well air-seasoned, and they stack same on kiln trucks with stickers, each nine, fourteen, or eighteen inches apart, after which it is given plenty of moist air.

The Hyde Lumber Company.

* * *

Kansas City, Mo.

Editor Canadian Woodworker:

We are passing you herewith some information in regard to results we have secured at our hardwood plant, Pine Bluff, Ark., in kiln drying of gum lumber. This information may be of interest to some of your readers, and, if so, we shall take our pleasure in figuring that we have been of some benefit to the users of this, as we consider it, valuable wood.

In the figures that are passed to you in the following, inch lumber only is taken into consideration, and if thicker or thinner lumber is to be used, the proportion should be figured in accordance. The lumber should be air-dried, at the very least calculation, sixty days—good results have been obtained at this age after sawing. Of course, better results can be obtained on ninety-day stock.

In putting the material into the kilns it should be stripped with inch sticks, preferably every 18 inches, the kilns carrying heat not to exceed 170 degrees Fahrenheit, with 85 per cent. moisture in loading into the kiln. The moisture should be run down at the discharging to about 10 to 15 per cent.

It is necessary to weight down the top boards in order to prevent them from warping, and this can be done best by running a clamp over each stack and extending down into the stack 15 or 20 courses or more if desired. A spring clamp could be made which would be possibly the best method, as this would take up the shrinkage and would put a sufficient amount of strain on the top boards to hold them absolutely straight. If spring clamps are not available, good results can be had by piling on the top course some other lumber, such as oak, using a sufficient amount to put about 2,000 to 2,500 pounds weight on the stack.

It has been the experience with our people that gum has not the tendency to honeycomb the same as oak, owing, of course, to the density of the texture of the wood.

We have been able to get moisture down to 6 per cent. within a period of six to seven days, and our experience has

proven to us that it is not necessary to reduce to any less degree than this, because sometimes when you dry to 1 or 2 per cent. of moisture the absorption of moisture after taken from the kiln will run it up approximately to 6 per cent. anyway, and in many instances this additional time is valuable.

We do not give the information above as any set rule for kiln drying of gum lumber, but only as an average. The climatic conditions, first in cutting and then air-drying, and the atmospheric conditions at the time the lumber is going through the kilns, all have their bearing on the results obtained, and they should be taken into serious consideration in the matter of handling through the kilns. Of course, with the furniture manufacturer he does not come into contact with the climatic conditions at the sawmill, but he can watch closely the atmospheric conditions at the time the lumber is being put into his kilns and record the changes and the different conditions under which each truck is loaded and dried and the results obtained. He can then arrive at the best manner in which to operate his kilns to get the most desirable results.

The Long-Bell Lumber Company.

Individual Motor Drive Popular at This Plant

Glass Garden Builders, Limited Appreciate Advantages of Having Their Machines Operated Electrically—No Belts to Hinder Working of Long Stock

The factory of the Glass Garden Builders, Ltd., Georgetown, Ont., is equipped throughout with individual motor drives, with the exception of two short lines of shafting for light duty machines, and Mr. Baldwin, the general manager of the company, advises us that this arrangement has proven very satisfactory.

Mr. Baldwin says that before deciding on the kind of power that should be used the duty of each machine was carefully studied out. In this manner it was found that some of the machines would turn out a large supply of parts in a short time, and would, therefore,

Product of Glass Garden Builders, Limited, Georgetown, Ont.

have to stand idle until required again; also, as some of the parts manufactured are long, it was decided that belts would be in the way, as well as being dangerous to workmen.

The reasons Mr. Baldwin gives for preferring individual drives are:

"The elimination of overhead shafting and long belts makes for a lighter and safer shop. The expense for upkeep and repair of belts and shafting is saved. A saving is effected by reason of all the motors being of just the proper horse power required by the machine to which they are attached. If only one motor had been installed it would have had to be of sufficient horse power to take care of many machines being used at one time, and its full capacity could only have been utilized occasionally."

The Glass Garden Builders, Ltd., have an electrically-operated recording meter which shows only the horse power used. On this their power accounts are based. The motors for the machines are all boxed in. This not only protects them from dust, but forms a work-table at each machine.

The accompanying plan shows the excellent arrangement of the machines, etc., at this factory. The sizes of motors used for the various machines are indicated on the plan. Ample room is provided for the proper handling of the work. The machines are of the Preston Woodworking Machinery Company's make. Our illustration shows the large moulder with the motor direct connected by means of a flexible coupling. This particular type of coupling is furnished by the Preston Woodworking Machinery Company, Preston, Ont., on all their machines that are to be direct connected to motors.

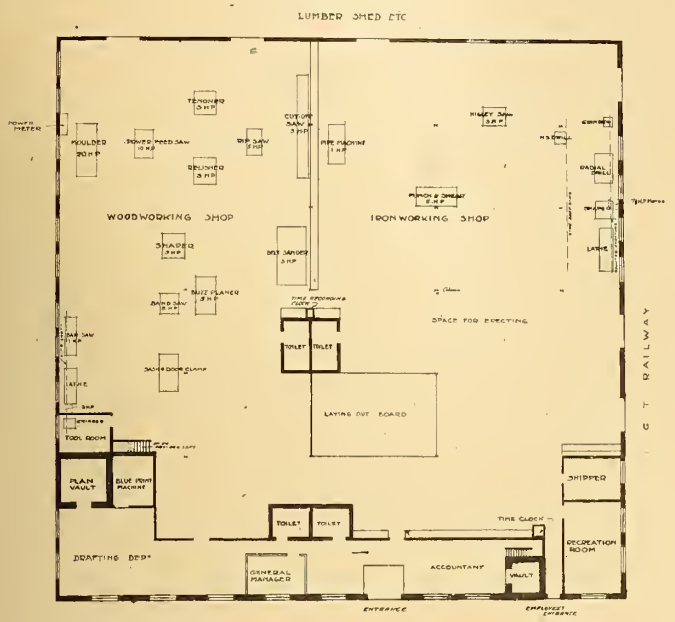
The products of the Glass Garden Builders, Ltd., as the name implies, are greenhouses and conservatories. These structures are of the iron frame or pipe frame type, with all glazing bars of wood. In the iron frame type cast iron sills are used, to which are bolted the flat iron rafters. In commercial greenhouses the flat rafters are extended into the ground and embedded in concrete. The greenhouses are also divided into the curved eave type, generally used for private conservatories, and the straight eave type, used by commercial growers. The purlins in each type are of angle iron. The wood used throughout is cypress. The glass is lap-jointed, embedded in putty, and secured by zinc glazing points. All parts are given a priming coat of paint before leaving the factory, another coat when the superstructure is up, and a final coat on completion.

While there are standard types, the sizes vary, the company having built houses varying in size from 9 ft.

Large moulder with individual motor at plant of Glass Garden Builders, Ltd.

by 6 ft. 8 in. to 61 ft. by 400 ft. Special designs are made to suit local conditions, when the greenhouses are attached to residences. All the houses built by the company are of pleasing appearance and sturdy design, with the maximum of light for efficient growth.

The heating of the greenhouses is important, and



Floor plan of factory of Glass Garden Builders, Limited, showing arrangement of machines.

the company install the heating, together with the benches, service building, and everything necessary for a complete greenhouse ready to start growing plants.

Besides greenhouses they manufacture hotbed frames and sash, sash and doors, cisterns and silos, garden furniture, pergolas and ornamental fences.

Cost of Bethlehem 4 Rd. 18 Pd. Fixed Ammunition Box

As is generally known throughout the country, contracts are being offered by the Imperial Government for the manufacture of this type of box to insure a continuance of the supply, which has been, up till now, taken care of by orders which were issued about seven months ago. Those who accepted orders at that time did so with the full understanding that the price quoted of $1.35 was very close, although a fairly safe proposition for factories which were more or less equipped to handle this class of work, and experience has justified the expectations that no more could be hoped for from this price than a bare turn-over. Some who accepted orders at this price failed to make deliveries; some have had a lot of trouble through trying to sail too close to the wind in the matter of labor and material, and some others have succeeded in coming out even, but in no case that we have been able to discover has the great amount of trouble and difficulty incident to handling a proposition of this size been justified, judging this as a plain business venture in comparison with other business ventures which have the sanction of sound judgment.

Now, from the very first, there has been an advance in the cost of all materials entering into this box, but judging from the fact that the Imperial Munitions Board are still offering the box at the same price, and also that some of the boxes have been accepted at this price, it must be that the actual conditions are not understood, or, if this phase of the situation is known, there must be a lack of knowledge regarding the actual manufacturing cost.

Sound business judgment and the experience of men who are in a position to know seem to indicate that the acceptance of any of these boxes at the present time at $1.35 is unsafe, as will readily be seen from the following, which is, as near as we can find out, a truthful statement of the average manufacturing cost by people who have spared no pains to make their equipment suitable for the work.

Lumber—	
10.8 ft. net spruce, plus 20 per cent. waste equals 13 ft., at $35 per M. equals	.445
Three three-ply diaphragms at .09	.27
Rod, plate, nut and chain	.26
Nails and screws	.04
Wire and staples	.03
Felt	.03
Glue	.01
Labor, including power, millwright, foreman, etc.	.20
Overhead, including interest, repairs, compensation, insurance, shipping, and incidentals, not less than	.10
	$1.385

From the above it will be seen that $1.35 is not a fair and reasonable price for this box. The difference might be trimmed off from the overhead expense, but this is an extremely dangerous thing to do, as it is already too small. Almost any man is willing to stake his intelligence against that of others in an effort to increase his profits, but there is certainly no satisfaction in playing a losing game, as this must be from the very start. Prices are increasing every day, and before manufacturers can possibly cover themselves on even a part of their material, the costs will be higher than those specified above. Then, too, suppose someone takes an order for parts of this box which for some reason he cannot supply; these parts will have to be rebought at the prevailing market prices, which are certainly not decreasing. One might take a chance on a thing like this if he had some margin to work on, but here, instead of a margin on the right side to allow for accidents, there is a deficit to start with.

In proof of the fact that conditions have changed since the first orders for these boxes were placed, we are giving below a partial list of material entering into their manufacture, the cost in the beginning and the cost at the present time.

	Price 1916	Price 1917
Wire	$ 9.00	$11.50
Nails	2.75	6.00
Glue	.13	.25
Lumber	26.00	30.00
Rods	.24	.26
Diaphragms	.18	.27
Felt	.02	.03
Labor	1.85	2.00

An average of the above figures shows that the approximate advance in the price of materials has been nearly fifty per cent., and while this average is not true considering the box as a whole, it serves as a very good warning against taking business at the old price, which can result in but one way, and that is, failure to deliver the goods.

The man who is satisfied with things as they are will never make them better.

Setting Teeth of Frame and Circular Saws

Only the extreme point of the tooth of a spring-set saw should touch the wood sideways when it is in the cut. The work of setting must be so carefully performed that the points of all the teeth project equally on each side of the saw, exact uniformity being essential if smooth and accurate sawing is to result. The set of each tooth should be measured by means of a gauge to see that it has been bent over the proper amount. The gauge must be held square on to the side of the saw, and in this position the point of the tooth should just touch that part of the gauge which has been set back to represent the amount of set on one side of the saw. There are a very large number of tools and appliances on the market for use when setting the teeth of saws. An experienced hand, however, usually prefers the old-fashioned saw set. This is a very simple tool, and can easily be made by the user if necessary. Those sold for the work consist of a steel plate, usually provided with a wooden handle, the plate having slots of different widths, cut in its edges to suit different thickness of saws.

The slot of the proper size to fit on the saw is placed over the point of the tooth, and with the necessary pressure on the handle the tooth is bent over the required amount.

Many elaborations of this simple tool have been contrived and are sold with the view of automatically regulating the amount of set required and the position of the bend on the tooth, both very desirable and necessary in a perfectly-set saw. Despite the fact that some of these special contrivances do their work well, and may be of assistance to a beginner, they are very little used by the sawfitter, probably because they cannot be absolutely depended upon to set all teeth exactly alike, as owing to some teeth having more elasticity than others they do not bend over equally. The use of these tools, therefore, do not do away with the necessity of checking over the set with a gauge.

Using the ordinary sawset, a man after a little practice will set the teeth of a saw both rapidly and accurately, using the gauge at the same time, correcting any little irregularities as he goes along. The use, therefore, of a more complicated appliance has very little attraction for him. Another way of setting the teeth is by means of blows with a hammer. Sawmakers almost invariably use this method. The tooth to be set is placed over an anvil, which is bevelled the same amount as the tooth requires to be set, and the point is bent over by one or more blows with a hammer. Appliances are made both for circular and frame saws, so that each tooth can be readily brought into the required position over the anvil; every alternate tooth is dealt with first, the saw being then turned over and the remainder of the teeth set in the same way as the first.

Although this method of setting the teeth is apparently a simple one, it requires some little skill, and a very great deal of care in its execution. It is easily possible to ruin the teeth of a saw if the blows are too heavy or if they strike the saw in the wrong place. Carelessness or want of skill may be the cause of crystallizing the steel at the point, making it brittle and liable to crack, or the metal may be spread out, making the saw thinner at the cutting point. However suitable this method may be when practised by an experienced sawmaker, for setting a new saw for the first time, it is certainly a fact that it does not find much favor with saw-fitters who require the saws to turn out clean and accurate work.

Experience will show how much or how little set should be given for different kinds of wood. Less set is necessary when dealing with hard woods than when sawing soft or fibrous material, and crossent saws require less set than ripping saws. A saw should only have enough set to give the necessary clearance for the saw in the cut, which amount must vary according to the nature of the wood being sawn.

If the set is too fine the saw will be liable to heat up and run in the cut, taking excessive power to drive it, owing to the friction between the blade of the saw and the wood. Excessive set will also take more power than if the saw was properly set, and waste wood through the wide saw kerf.

Saws unequally set have a tendency to run out sideways on the side which has the greater set.

While for several reasons it is desirable that all the teeth of a saw should be of the same shape and size, it is particularly necessary when swage set is adopted. The actual operation of setting a spring set saw takes place before it is sharpened, while a swage set saw is always set after it has been sharpened, although the latter may often be re-sharpened without requiring to be re-set.

For swage set the teeth must not only be of the same shape, but their points must be brought to a suitable angle for swaging. The point must not form too acute an angle or it will be too weak or too obtuse, as it would then be difficult to swage, an angle of 38 degrees to 40 degrees being most suitable.

Stout saws are usually set by means of an "upset" swage. This is a punch with two notches of hardened steel. One notch has a rounded face, and is used to spread the point of the tooth, and another notch has a flat face, and is used for squaring up the points after they have been swaged.

First, the rounded notch of the punch is held against the front of the tooth near the point, and the latter is spread out by means of a few blows with a hammer, after which the top of the tooth is squared across by applying the flat-faced notch in a similar way. The more expert the operator the more evenly will each tooth be set. Not only must the teeth be spread out equally on each side of the saw, but the set on each tooth must be a duplicate of the others.

To correct any errors when swaging a side file is used. The object of the side file is to reduce all the swages to an equal width on each side of the saw, and at the same time to give a clearance between the top of the tooth and the blade. The file is usually held in a small fixture. Three set screws are fitted in this below the file, adjusted so that when their points rest against the side of the saw the file is held at the required angle to give the necessary clearance and at the same time equalizing the amount of set. When the file removes a good deal of metal it leaves a flat on the sides of the set, which should be backed off by a hand-file.

Thinner saws are more easily and accurately set by means of appliances known as swages. These vary considerably in design, although the principle on which they work is much the same in all makes. The top of the tooth to be swaged bears against a hardened piece of steel, known as the anvil, the face of which is ground to a suitable angle. The tooth is spread by means of a circular eccentric die, which works on the front of the tooth, spreading it out, and giving more or less set according to the amount of movement of the die. The varions patterns of this tool vary in the arrangement of the stops, etc., for quickly setting the swage in its correct position on each tooth.—Timber Trades Journal.

Upholstering and Trimming

Dyestuffs and Cost of Fabrics

During the course of an address recently delivered by Mr. J. Whitall before the Boston Carpet Club, he said:

"It may interest you to know that certain American dyes have increased in price in a manner that would make the German dyes blush. For example, a certain American-made orange now sells for $1.25 instead of 13 ½cents, an increase of over 800 per cent. And wherever you find a domestic product which is calculated to replace a foreign dye you will find it offered at a corresponding increase, as, for example, a domestic fast black at $1.50 designed to replace a foreign product that sold at 26 cents before the war.

"Therefore, it is not possible to give even an approximate average percentage of increase in the cost of dyestuffs. There are so many things to be considered, such as what color you want, how much you want, how badly you want it, and last, though not least, who has it to sell.

"We have bought foreign dyes," continued Mr. Whitall, "at increases which range all the way from 500 to 2,000 per cent. Naturally there has been much speculation in dyes, but the real speculator is the fellow who buys from strangers in other than the original unopened container. He is very likely to find that he has paid a big price for a little dye and a lot of salt. There are some dyestuffs which cannot be even approximated by a domestic product, and for these the demand has been so great that the prices have become almost prohibitive, and in some instances the supply has been absolutely exhausted. This is particularly true of what is technically known as S. A. P. blue, which is so well and widely known that it has become practically a standard. There is no question of the durability of this coloring when properly handled. Even the darker shades have the peculiar property of showing blue under artificial light and not looking like a black. Before the war this dyestuff sold at $1.25 in quantity, and since that time it has sold at varying amounts, until it finally reached the pinnacle and sold for $25 a pound, or 2,000 per cent. above its former price. And at that we were glad to get it, and thankful that it wasn't all gone before we were able to get our share."

In the course of his talk Mr. Whitall stated that the buying public evidently had lost sight of all the other very important elements that go into the cost of manufacture, and laid all blame at the door of the anilines. "In a way," he stated, "this was more or less justified, as the price of dyes is now so high that it is impractical to use some colors at all, and certain other absolutely necessary colorings can be made and sold only at a special price, provided, of course, that anilines are used. There are few who realize the vastness of the dye-making industry. People speak of making dyes in this country as if it were a simple manufacturing proposition to be accomplished over night. For years dye-making has been one of the great industries of Germany, and the present product is the result of years of experience and research. Some idea of the size of the undertaking can be gained from the mere statement that during the years 1913 and 1914 there passed through the custom house 5,674 different anilines. I am free to admit that I had no idea that there were so many. When I told people that the Whitall mills have standardized over 2,700 colorings they have looked at me in wonderment, and yet all of our colorings are produced with but a small number of basic anilines.

"This, I think, sums up the situation fairly well. I have not tried in any way to justify the high prices, because the public knows pretty generally that there must be very substantial increases in any industry which is wholly dependent on the foreign markets for its raw materials. But what I hope to have impressed upon you is the fact that the increase in fabrics is far less in proportion than the increases in the materials, and that if there are any further increases, it will be because the mills are driven to it, and see no way to avoid it without sacrificng quality and fast dyes in an effort to keep down prices."

Upholsterers to Meet in Chicago

The Executive Committee of the Upholsterers' Association held a meeting in Chicago on April 6, to make plans for their annual meeting and election of officers, which is to be held in Chicago on May 8 and 9, at the Auditorium Hotel. The experiences of the upholsterers in fighting the high cost of production during last year are said to have been interesting, but that the results achieved by the association members have been almost uniformly satisfactory.

The Label Committee have been at work on the association label, which it is expected will be adopted when the association meets in Chicago. This label will carry a guarantee to the users of members' furniture, and has been endorsed by the National Home Furnishers' Association.

One of the problems that will likely be given some attention at the meeting will be the better handling of labor, as labor troubles have been rather prevalent of late. Some headway has been made in the matter of collective buying, and a commission working on this is expected to have an interesting report.

The presence of the ladies of the members has been made a semi-annual institution, and a local committee is preparing an attractive programme to include them.

Du Pont Takes Over Marokene Plant

The Du Pont Fabrikoid Company, with main offices at Wilmington, Delaware, U.S.A., has purchased the Marokene Company, of Elizabeth, N.J. The Marokene Company manufactures a material similar to fabrikoid, which is used extensively by the automobile, carriage, and upholstery industries.

Mr. R. B. Heyward, who has been assistant superintendent of the Fabrikoid Company's Newburg plant, will become superintendent of the Marokene plant at

Elizabeth, N.J. No changes will be made to the present staff of employees.

The purchaser will make thorough investigations in order to learn if any improvements can be made to the product, and if possible will better same, thus upholding the Du Pont standard.

All the sales transactions of the Marokene Company will be under the direction of the Wilmington office, and the attention of Mr. J. K. Rodgers, sales manager of the Du Pont Fabrikoid Company.

Leather from Shark Skins

The condition of the leather market makes desirable the utilization of all available supplies of suitable animal skins. The Bureau of Fisheries of the Department of Commerce in the United States has taken up the possible value of shark skins in making various kinds of leather. Such skins, as is well known, have for many years had a limited demand in the United States as coverings for minor articles of ornament and utility, but their use as leather has been very restricted. An acceptable leather has been prepared from shark skins in several foreign countries, and there is no apparent reason why the skins of certain sharks caught on our own coasts or in foreign waters may not be converted into serviceable leather by American tanners.

Shark skins are very tough and durable, and some of them show a beautiful surface pattern which persists in the tanning process.—Southern Furniture Journal.

Decision on Artificial Leather Advertising

For some time past the patent and enameled leather interests in the United States, through their trade association, have been decrying the advance made in the variety of manufacture and use of artificial and imitation leather, or substitutes for leather, and have questioned the right of the artificial leather manufacturers to the use of the word "leather" in connection with their product. Much agitation, including lengthy arguments in advertising form, has been brought about by the claims of each side, the artificial leather interests accusing the patent and enameled leather interests of deceiving the public by the production of split hides as against genuine grain leather, offering same as "leather" without specifying. Finally, a complaint was made to the Federal Trade Commission under the "unfair competition" section of the Clayton Act.

The commission notified a New York manufacturer of leather cloth as follows:

"A complaint has been made to this commission that your company is engaged in producing, advertising, and marketing, in interstate commerce, materials to imitate the finish and grain effects of genuine leather for upholstery use under what is alleged to be an erroneous, false, deceptive, and misleading guise of 'leather,' and that the use of such brand or appellation on, and in reference to, said material, is an unfair method of competition in violation of section 5 of the Federal Trade Commission Act."

The manufacturers denied the allegation, and presented a concise statement of facts, together with samples of products, advertising literature, price lists, trade-marks, etc., to show that there had been no violation of the law, and courted a thorough investigation.

It was pointed out that the product was sold as "The Leading Leather Substitute," this line invariably appearing in each advertisement. Further, it has been stated that leather cloth is made on various qualities of cloth, such as muslin, duck, drill, laminated cloth, etc. The goods are further offered 50 inches or wider in factory rolls of twelve yards. Nobody could imagine that they were buying real leather from real hides in such measurements even if the appearance of the goods did resemble real leather in finish and grain.

Not only has the price of genuine leather advanced greatly, but almost all raw materials used in the manufacture of leather substitutes has increased likewise, so that the buyer must not only use his judgment but his eyes in seeing to it that he gets just what he asks for.

A lapse of practically six months occurred, in which time the Federal Trade Commission investigated and considered the application of issuance of a complaint against the manufacturers. The commission then advised the manufacturers "that it would not be proper for it to forbid the use of the word 'leather' on such fabrics, provided the fact that they were not made of real hides of animals appears with reasonable clearness, by any appropriate form of expression."

"Seat Weaving"

Under the above title an instructive book has recently been published by the Manual Arts Press, Peoria, Ill. Mr. L. D. Perry, supervisor of manual training at Joliet, Ill., is the author. The book explains clearly the process of caning chairs, re-seating chairs, how to use cane webbing, how to do rush seating, how to do reed and split weaving, how to prepare stain and finish raw materials, and do the bleaching. The various processes are illustrated with photographs and line drawings. Illustrations show some good examples of furniture with caning used as a decorative element. The matter is printed on good paper. The book is strongly bound and of a convenient size for handy reference. It is offered for sale by the publishers at $1, postpaid.

Information for the Repair Man

Nearly every furniture dealer is asked some time or other to do a job of refinishing for a customer, and the most troublesome part of the work is removing the old varnish. This can be done either with one of the patent varnish removers or by the quicker and cleaner dry method. This consists in coating the surface with a very hot solution of strong glue, applied thin, like thin varnish, and allowing the job to stand in a warm room over night. Next morning most of the varnish will be found hanging in flakes, and a little rubbing with sandpaper of the right degree of fineness will soon make the surface clean, right down to the wood, when it can be rubbed and made ready for the new finish. The dry method of varnish removing has the added merit of not raising the grain of the wood. New varnish or stain can be applied as soon as the sandpapering is finished. Care, however, is needed in both methods. If every bit of varnish is not removed, subsequent coats will appear raised and uneven. This is detrimental to good work.—Painters' and Decorators' Magazine.

Varnish for Brasswork

In a glass bottle place one-quarter ounce of shellac and one-quarter pint of methylated spirit. Securely cork and shake up well, and allow to stand in a warm place for a few days. Then pour off the clear fluid and apply it to the brass with a camel-hair brush.—B. C.

"Safety First" Department

A Practical Jointer Guard

Some years ago, when an apprentice, I wished to take a quarter of an inch off a short strip of wood about 1½ inches wide, ½ inch thick, and 18 inches long. I therefore proceeded to pick out the most innocent looking machine in the place, and finally decided on the jointer or buzz planer. No person happened to be close enough to offer advice. The result was that the stick hit the ceiling about the same time as it hit the knives. I still have all my fingers and thumbs in good condition, but it was a miracle that I did not lose them.

My illusions in regard to the innocence of that machine disappeared long ago. I consider it one of the

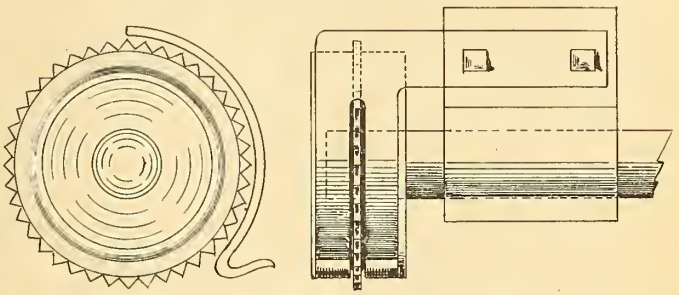
Fig. 1—The wrong way of running stock over jointer.

most dangerous in the equipment of the woodworking plant, and I believe the majority of woodworkers will agree with me. The jointer guard shown in the accompanying illustrations has proved satisfactory. It has a spring attached which makes it close automatically the moment the piece of work has passed over the knives. As the guard always covers that portion of the knives not in use, the operator cannot forget to use it.

These photographs also show the right and wrong way of running stock over a jointer. In running stock as shown in Fig. 1, if the piece kicks back, the left hand is right over the knives, and is bound to get injured. The hand should be held as shown in Fig. 2—well back from the end of the piece of wood.—C. B.

Protecting the Operator of the Rip-Saw

One day while watching a man feeding short stuff through one of these machines at a fast rate, it was noticed that the man's right hand came very close to the spur-feed. He was asked to "trade jobs" for a few minutes. The way that vicious feed jerks the stuff away from you gives a man cold chills when he has not experienced the sensation for considerable time. The writer decided that he would not run such a risk himself, consequently had no right, legal or moral, to let anyone else do so, even if he were willing. So the simple little iron guard was placed over and partially around the "danger zone," and as the guard raises and



Guard for spur feed of rip saw.

lowers automatically with the spur-feed, it is next to impossible to do yourself any injury. In this way the machine was made safe, and its capacity was not at all affected.

The guard is made of wrought iron, ⅛ in. thick, which is easily bent to the desired shape. It is shown partly opened up the centre, so that the operator can see the spur-feed, which is better than having it completely covered, and is just as safe.

No one likes to run a machine with its working

Fig. 2—Correct way to run stock over jointer.

parts invisible, but this need not stand in the way of sufficient guarding.—W. J. Beattie.

It is the little waits and hitches—seemingly unimportant when considered apart and alone—that rapidly increase the cost of doing work when computed together.

Education in itself is nothing. It is what use one makes of his brains that counts. Directness of purpose with concentration along one line is what produces results.

THE FINISHING ROOM

Does It Cost Less to Finish Gum Furniture?

A furniture manufacturer advises us that it costs from 25 to 30 per cent. less to finish gum furniture than solid oak. A manufacturer of gum lumber states that it costs approximately 20 per cent. less to finish than any other hardwood. Another furniture firm states that their gum furniture in the imitation walnut, imitation mahogany and enamel finishes costs just as much to finish as maple or birch, but that it is slightly cheaper to finish than oak, as the filling process is not required in finishing gum. Still another furniture manufacturer points out that gum in the kyonix or fumed finish costs very much less than when polished, but for mahogany finish they are of the opinion that it costs just a trifle more than other woods. They state, however, that the difference is not worth mentioning.

Undoubtedly there is room for a profitable discussion on the finishing of gum furniture and woodwork, and we will be pleased to co-operate with our readers in bringing about a discussion. If they will send us any suggestions or special information which they may have we will be very glad to give it space in these pages. In the meantime the following formulas, prepared and issued by the Gum Lumber Manufacturers' Association may be of interest.

Formulas for Finishing Gum

No. 1. Furniture Finish.—First, sandpaper the wood perfectly smooth(this is very essential in any wood in order to obtain a good finish). Then apply one or two coats of shellac, sandpapering this coat when dry; then two or three coats of high-grade varnish, rubbed down with steel wool between each coat. The final coat should stand for at least eight days, after which it should be rubbed with water and pumice stone first, and the next day with rubbing oil and pumice. If a stain is desired, the same process should be followed, excepting that first the finisher should stain the wood to the desired color.

No. 2. Wax Finish Natural.—First, one coat of white shellac; sandpaper when thoroughly dry, then finish with prepared wax.

No. 3. Walnut Finish.—To put a walnut finish on gum the following formula will give perfect satisfaction:

1¼ oz. walnut crystals.
¼ oz. blue-jack nigrosine.
Mix with two gallons of water.

If a lighter color is desired, reduce the stain half with water. On top of this, after dry, it should receive two coats of white shellac, this to be sanded down and waxed.

No. 4. Eggshell Gloss for Interior Finish.—Two coats of pure white shellac, two coats of clear rubbing and polishing varnish. Allow each coat to dry thoroughly and rub down with steel wool between each coat, the final coat to be rubbed down with pumice stone and oil.

No. 5. White Enamel Finish.—Unselected gum and red gum have superior qualities for taking and retaining white enamel finish. First, apply three coats of flat white (by "flat white" it is meant simply to reduce pure white lead with turpentine), or first apply three coats of any standard enamel under-coater, then apply two coats of any good enamel. Time should be allowed between each coat for the paint to become thoroughly dry. Each coat should be smoothed with fine sandpaper, excepting the last coat, which may be rubbed with pumice stone and water, to produce a dull finish. Special formulas are used for enamel finish on furniture and pianos, and this finish on gum is equal to polished ivory.

Pin Holes can be Prevented but not Cured

By C. J. LaVallee, President, Marietta Paint and Color Company

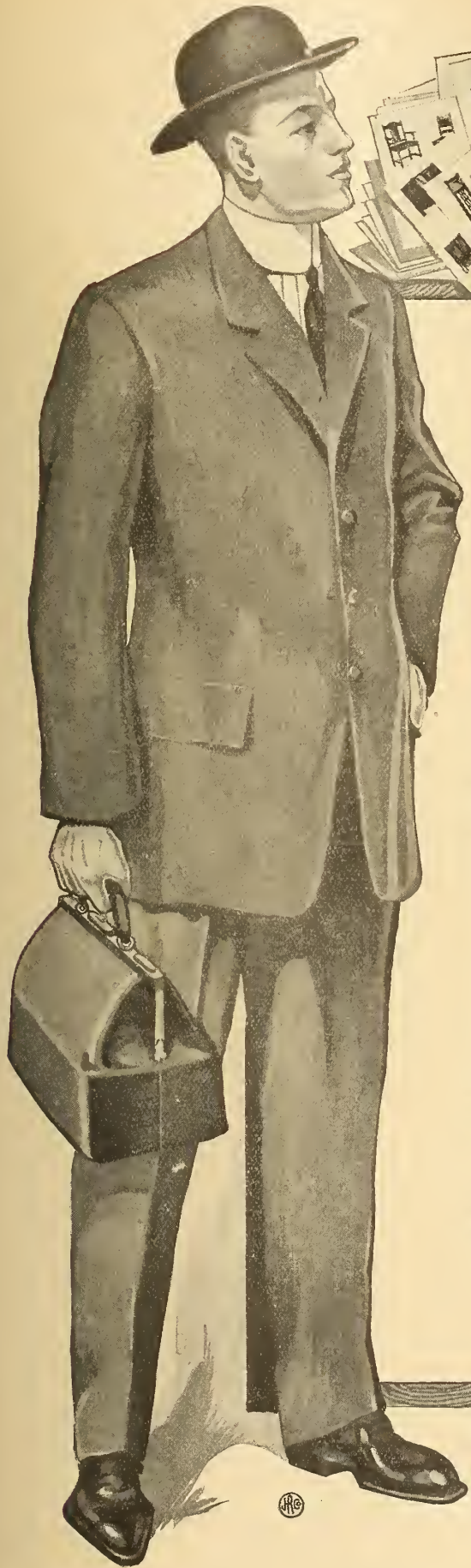
There is nothing more irritating than to approach the completion of a fine piece of wood finishing and then come face to face with the pin-hole nuisance. Not only is it irritating, but it is expensive, for it means loss of time, material, and temper, and all these are too valuable to let go of without a struggle.

And, like a great many other evils in the world, with this pin-hole evil there is more virtue in an ounce of prevention than a pound of cure. When the pin holes have actually appeared, it is almost a hopeless task to get rid of them. It is much like attempting to cure a malady for which the only remedy is amputation or complete eradication of the diseased part.

The first step is to get at the cause—and this is not difficult to find in the case of the pin-hole evil. In the case of oak, at least, the trouble lies in the lack of proper seasoning of the wood. If you will look into the matter you will find that the pin holes are scarcely ever encountered where the wood has been seasoned by the old, reliable method of stacking the boards, separating each layer with sticks so as to permit the air to circulate between them, and allowing them to stand in the weather for five or six months. Nor will you find pin holes where the logs have been rafted from the forest to the mill and allowed to become thoroughly water-soaked.

The reason is that both of these processes destroy the cells which contain the free tannic acids of the tree. When these cells have been destroyed, you have an unobstructed pore that admits the filler and enables the finisher to pack it in solidly by the ordinary wiping process.

When taken from the kiln and exposed to the air, the wood does not absorb so much moisture as it would had these cells not been destroyed. And when, through excessive humidity, it does absorb the moisture, it does no greater damage than to raise the grain, for the little cells which were the cause of the pin holes have been destroyed. In cases where the grain is raised, it is a simple matter to sand it down, and there are no after-effects to harrass the finisher.



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or for sample panels

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What really causes the pin holes is this: The little cells, when not killed either by the weathering or the water-soaking process, are dried, but not destroyed, by the heat. They remain whole, and retain their acid content as well as their moisture-absorbing property. It requires only the moisture of the air of the ordinary finishing room to cause them to swell.

The result is that when the finisher attempts to fill, his efforts are balked by these little acid sacks in the bottom of the pores. He succeeds in filling the pore, to all outward appearances. But when the filler begins to oxidize, he has only a film over the pore, which excludes the air. Due to this moisture and the warm air of the finishing room, a gas is formed underneath this film, which finally forces its way through the filler and produces the pin hole, which is nothing more nor less than a small opening in the pore.

On account of the moisture which has caused this gas having filled the bottom of the pores, it is impossible to fill these pin holes. The filler cannot be made to take hold because it encounters a little gaseous cushion in the bottom of the pore that repeatedly defeats the efforts of the finisher.

I know it is the custom of finishers and manufacturers to blame these troubles on the filler; but I can make the positive statement and can prove it by practical tests, that the filler cannot cause pin holes. And any manufacturer can prove for himself that the trouble is not in the materials his finisher works with, but in the method of drying his wood.

Care of Varnished Hardwood Floors

Plattsville, Ont., Feb. 22.

Editor Canadian Woodworker:

Some time ago I noticed directions for the care of varnished hardwood floors in a copy of the "Canadian Woodworker." I, however, mislaid the book, and regret that I have been unable to obtain the desired information elsewhere.

Could you furnish the directions or request, through your magazine, that readers submit for publication any satisfactory preparations which they may have?

(MISS) G. H. BAIRD.

* * *

The care of varnished hardwood floors is not at all difficult, providing that good material has been used. If the floor has been well filled and allowed to dry thoroughly, apply at least three coats of the best quality floor varnish, using it lightly and having each coat absolutely dry before applying the next. Do not use any shellac whatever in floor finishing. There are good varnishes specially prepared for this purpose—"Leignia Granite," by Berry Brothers; "Mar Not," by the Sherwin-Williams Company, Ltd., etc. All manufacturers of varnish have special names for this product.

To keep a varnished floor presentable during use, go over it with a light liquid wax, using a pad attached to a mop handle, or some such method. Ronuk, Limited, Toronto, make floor waxes to suit all work of this kind.—W. J. Beattie, Owen Sound, Ont.

* * *

A great deal of the trouble with varnish on hardwood floors is that shellac is used for the first coat. Shellac should never be used underneath varnish on floors. The result can only be unsatisfactory wear. The varnish will naturally be blamed, whereas the fault lies with the shellac. The proper way to finish a hardwood floor is to clean it off thoroughly and then give three coats of the best floor varnish obtainable, sandpapering lightly between coats. An oak floor should first be filled with a paste filler. If a floor treated in this manner is given a light coat of varnish about once a year it will always remain in good condition.

Boiled oil should never be applied on hardwood floors underneath varnish. It not only has a tendency to darken the wood, but will also eventually "sweat out" to a certain extent and give trouble. You are no doubt aware that there is practically no such a thing on the market to-day as genuine boiled linseed oil. At least 95 per cent. of the boiled oil is made by adding liquid driers at low temperature, and not by the old method of heating up to the neighborhood of 450 degrees, in combination with powdered driers.—H. V., Montreal, Que.

* * *

Re treatment of hardwood floor: There has been, and is to-day, 100 methods for treating hardwood floors, but in our estimation there is one correct way only. That is to apply first coat on the wood with the same material as you finish with, or, in other words, you use the same varnish for first, second, and third coats as required. First coat should be thinned about half-and-half with turpentine; second coat, about three of varnish to one of turpentine; and last coat, with straight varnish, allowing 48 hours to dry between coats. This method will produce a floor finish that cannot be excelled on all the close-grained woods, such as birch, maple, etc.

For oak floors we suggest using a very dry filler. First fill the wood with dry, short filler, then sandpaper, dust out, and apply varnish in the same manner as if treating birch or maple floors.

Floors treated in the above manner will hold their original color for years, and nothing but absolute wear will remove varnish. All chipping, cracking, and blooming, etc., are eliminated when the above method is followed.—Ottawa Paint Works, Ltd., Ottawa.

* * *

In regard to the care of varnished hardwood floors, the older varnish gets the more it will oxidize, or get brittle, causing it to crumble under the severe usage to which floor varnish is always subjected. Take a cloth soaked in raw linseed oil and wipe the floor thoroughly; then take a clean cloth and wipe till it is dry. By doing this occasionally it toughens the varnish and gives it new life.—Charles W. Inglis.

* * *

Varnish is not a proper treatment for a hardwood floor, because just as soon as it is walked upon the varnish becomes ground up into minute particles and is dusted away. In time the wood becomes bare; then, being exposed, it turns a dark color.

The only treatment then is to clean well the damaged or defaced part with a mixture of one part linseed oil (raw), one part liquid dryer, and two parts turpentine. Damp a cloth with this and apply to the damaged parts. Then, if the floor must be varnished, revarnish, using a stain if required, but the best results are obtained by waxing after rubbing the floor down with pumice stone and oil, cleaning off the oil well before waxing. The wax should be hard wax, and the turpentine should be sparingly applied and brushed.

One pound of best hard wax to three pints of best American turpentine, lightly applied, and well rubbed, will give the best results, and is easily repaired. Varnished floors are always a source of trouble, as they have to be continually cleaned and revarnished. Oil should never be used, either, because although it is the

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Universal Spray Head (2 sprays in one)
Finishes both large and small surfaces economically
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best preservative, it turns the wood dark and discolors it.

Whenever practical it is best to dispense with a varnished floor, as a moment's thought will convince any practical man that a coat of gum or resin will not stand being constantly walked upon.—James Culverwell, Toronto, Ont.

* * *

The care of varnished hardwood floors is a problem, and each case must be taken individually, but to prevent a botchy finish on a floor finished with a varnish preparation it is necessary to varnish frequently and not allow the finish to be thoroughly worn off at any time.—Canada Paint Company, Ltd., Montreal, Que.

DeVilbiss Manufacturing Company Exhibit at Safety Exposition

Complete equipment of the Aeron system of varnishing or finishing with air under pressure, featuring particularly the Aeron exhausting system, was, on invitation, exhibited by the DeVilbiss Manufacturing Company, of Toledo, Ohio, at the third annual Industrial Safety Exposition of Ohio, held by the State Industrial Commission, at Columbus, from the 6th to 10th of March.

This is truly indicative that those in authority in well-organized safety work are not slow to give proper recognition to such appliances and methods as are successful factors in providing for the general betterment of and safer working conditions in the industrial field.

Without workmen who are healthy, satisfied, and happy—regardless of any other essential qualifications they possess—good and profitable work is almost an unproducible quantity in the best of well-equipped plants. Knowing this from its own manufacturing experience, the DeVilbiss Company states that it has, in addition to perfecting a time and labor saving cost-reducing painting system, devoted considerable thought and attention to the development of practical safety and health first equipment and methods in connection with the Aeron system. Moreover, the company advises us that it is constantly endeavoring to devise and work out new ideas and improvements along these lines, with the single view of enlarging to still larger and more effecting proportions the scope of this important part of Aeron system service.

As a result of this, the Aeron system of to-day makes ample provision for the removal of fumes from the finishing room, thereby eliminating the possibility of finishing-room sickness and minimizing the danger of fire. Thus it is that clean, pleasant, healthful, and safe working conditions are insured in the paint room; that finishers become a happy, efficient, and willing lot of men; that manufacturers get desired production and a better quality of work.

The DeVilbiss Company distributed special folders at the exposition, pointing out in detail the safety features of the Aeron system of finishing and giving other information of interest to users and non-users of the Aeron system. A copy of this folder can be secured by writing the DeVilbiss Manufacturing Company, at 1318 Dorr Street, Toledo, Ohio.

Furniture Finishes

With reference to the recent standardization of furniture finishes Hardwood Record says:

"The furniture manufacturers seem to be making a mistake that does not do credit to their intelligence, and does not suggest that they are sufficiently clever in merchandising their products. Just because brown finishes are popular at present, and go well with the period styles, the producers are working the brown idea to death, and practically everything is being offered with that kind of finish.

"A big wholesaler was commenting on this fact recently, and admitted that he thought a mistake had been made in putting the loud pedal exclusively on the browns. He pointed to goods on his floor, made of oak, mahogany, and walnut, and all finished in brown. All, incidentally, were exactly the same shade of brown, which meant a very dark finish, not at all suggestive of the natural colors of any of these woods, even the walnut being finished much too dark.

"A little more variety in the treatment of the various materials with which the furniture manufacturers have to work would give the public a chance to 'pay its money and take its choice,' whereas the assumption that everybody wants brown may prove to be a mistake, or at any rate will cause an ultimate revulsion from it. Brown is an attractive color, and is well suited for use with Circassian and American walnut, in addition to gum. But to finish every wood on the list that way will mean that before long nothing that is brown will stand a chance of being sold; the public will have tired of this color, and will be looking for red or pink or grey or whatever the furniture fashion designers decide is the proper color (regardless of the character of the woods themselves).

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Veneers and Panels

Using Quartered Red Gum for Piano Cases

Amherst, N.S., April 3.

Editor Canadian Woodworker:

We have made up a few cases of quartered red gum and are finishing the same without any attempt at disguising the wood. The result in appearance is excellent, and so far we see no reason why there should not be an extended use of this wood in the manufacturing of pianos. It only remains for manufacturers and trade journals to educate the public to an appreciation of it.

Amherst Pianos, Limited.

So far as we are aware, this company is the first to use figured red gum for pianos. It is quite likely, however, that others will follow their example. The piano industry is one in which fancy figured effects are much sought after. American burl walnut and Circassian walnut have been used extensively in the past. At the present time Circassian walnut is scarce and expensive. If cases veneered with this wood are still in demand and the wood not obtainable, no doubt figured red gum offers a solution of the difficulty. Amherst Pianos, Ltd., state that they finished their red gum cases without any attempt at disguising them. It is possible to imagine that red gum piano cases finished in the natural shades would present an attractive appearance.

Elsewhere in this issue a correspondent says that there is a great deal of waste occurs in the matching of figured gum veneers on account of the figure changing so quickly, there being a very noticeable difference in sheets only one-twentieth of an inch thick. A practical veneer man with whom we discussed this point said it was quite true, but that exactly the same difficulty occurred in matching quartered oak veneers. He said that the only practical way of matching quartered oak veneers for piano cases where jointing was necessary to secure the width was to joint the two sheets next each other as they occurred in the log.

The operation of matching quartered oak veneers, as explained by our informant, is as follows: Estimate roughly how many cases can be made out of each flitch and then keep each flitch by itself. After estimating the number of cases each flitch will make, the flitch is cut to suit the lengths of the falls, doors, etc. For instance, if it is ten feet there will be two lengths. The sheets comprising one end of the flitch are then taken just as they occurred in their natural form in the tree and laid out for the fronts of the cases. Starting with the top of the case, two sheets are taken for the top door (if one is not wide enough); then the shelf, falls, etc., are taken in order. At the bottom door a break occurs in the case, and as long as the figure matches fairly well it is all that is required. For the top part of the front, however, if this method of taking the sheets as they occur in the flitch is adopted, excellently matched cases will be the result. The ends of the case or gables, arms, etc., are matched in the same way.

The party who explained this operation of matching the quartered oak veneers said that it was undoubtedly harder to match the pronounced figure in red gum than the flake in oak, as with the latter it was not necessary to have an exact match, but that no doubt some system of this kind could be used with the gum.

Another veneer man explained that his experience in cutting and matching veneer had been that with practically every kind of veneer that required matching it was necessary to take the two sheets occurring next to each other in the log in order to secure a match. He ventured the opinion that gum is not much more difficult to match than either Circassian walnut or burl walnut.

If the waste factor can be overcome in matching, it does not seem unreasonable to suppose that figured gum veneers may be used to some considerable extent for pianos. Then if they are suitable for pianos, it is just possible that they will find their way into the manufacture of talking machine cabinets also, if they have not already done so. This industry is growing rapidly, and is responsible for the consumption of rather large quantities of fancy veneers.

Making of Veneered Columns

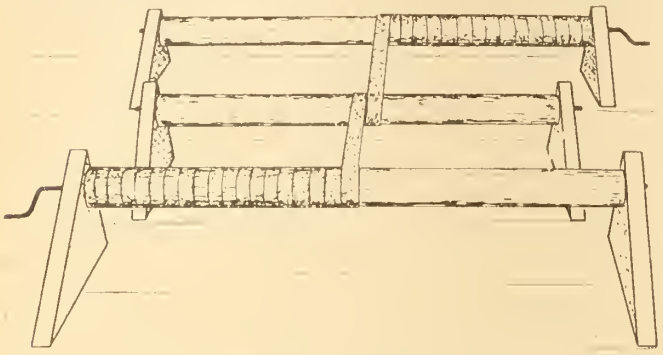
Making columns of solid wood is practically an extinct operation. Experience taught that the built-up column would last longer. It seemed to make little difference how often the solid column was painted and filled—in a very short time it cracked and became unsightly. As a consequence, the stave, or built-up, column has come into almost universal use. It is easy to make, and, if well put together, is almost everlasting.

Very few small mills use the same style of joint, though those which use the regular column stave machine have to use the same joint, and for a stock column it makes a good joint. Fig. 1 is for inside columns, and should be of 7/8-inch material, as that thickness will stand the heat much better than thicker material, the glue man can make a better job, and the mill saves material. If a neck mould is required, there is a half-inch to turn on. If a heavier neck mould is wanted one can cut in the same as is done on the veneer column in making column as shown in Fig. 2, which is used for outside work. This column is made and put together with white lead, there being no glue used. The staves are dovetailed and slipped together from the end, the dovetail made so as to draw the joints tight. After they are put together chains should be put on them. Then they should be gone over and tapped with a mallet, just as is done in the case of glued work. This column should be made of 1¾-inch stock, so as to allow the dovetail to be as strong as possible.

As such a column is made with the use of white lead instead of glue, it will stand the weather and

never rot in the joints. The staves may be run on the shaper by using an adjustable column form and reversing the stave each time it is run. Where quantities are demanded they may be run on the moulder.

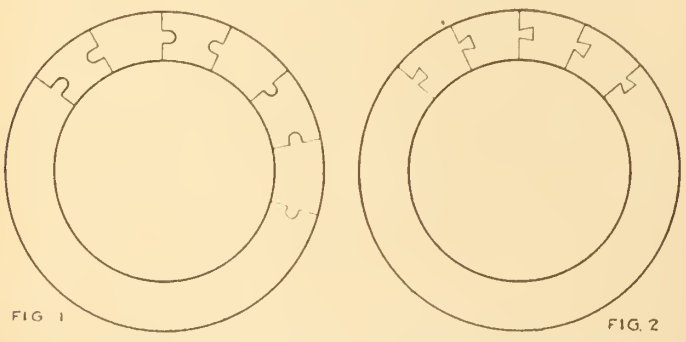
One of the best and quickest ways to put veneer on a column is to have two rollers about ten feet long and six inches in diameter (see sketch), about three feet



Sketch of Machine for Veneering Columns.

from the floor and three feet apart. Then use three-ply canvas belting, say, thirty feet long and three inches wide. Oil this so as to prevent any glue from sticking to it. It is well to have about six of these belts. Have them wound around each roller, from end to centre. Cut and prepare the veneer, have the column thoroughly warm, place the veneer on, and tack the edges about every six inches with very small tacks. Slack the belt in the centre, so as to give one turn around the column, each of the rollers having a crank on the end. Then two men keep turning in opposite directions, releasing the belt from the rollers to the column until the ends are reached. In this way the veneer is drawn as tight as desired, and the surplus glue forced to the ends, which prevents any air spots remaining under the veneer. Place a hand-screw at either end to hold the belt. After once prepared to do this kind of work it takes but a few minutes to veneer a column. To finish the job, take it to the shaper and let the operator cut a groove where the veneer comes together, about 1/4-inch deep, just wide enough to trim the edges of the veneer. Then match the strip with the veneer, and a good job is done.

In this way it is possible to glue as many columns as one has belts. Use only two blocks, one on each end of the column, with a heavy spike in the centre to



Column Joints for Interior and Exterior Work.

drop in support, as there is very little strain on the ends. When the belt is run on the column, remove the blocks from the ends and place on the next column. The rollers should be arranged so they may be removed when not in use.—Hardwood Record.

Talking Machines Feature of the Year

Talking machines constitute the biggest outstanding feature of last year's development in the veneer and panel industry, says J. C. Taylor in "Veneers." There are other lines in which veneer has shown progress, and there is room for some argument as to whether there has been more additional volume of business developed in built-up stock for packing boxes or in the making of cabinets for talking machines. When we consider, however, that the veneer used in making talking machine cabinets is of materially higher value, it has easily taken the lead. Also it has carried with it a lot of three-ply for shipping cases.

Talking machines were not a new thing at the beginning of 1916. They have been familiar articles in the trade for some time, and they have been factors of some importance in the veneer trade for a number of years, but during the past year there has been a wider development in this line than in any other calling for veneers and panels. It seems as if, almost suddenly, there has been a widespread popularizing of the talking machine as a musical instrument, with the result that during the past year there are many new manufacturers and a much wider field of distribution. One of the features of the summer trade among furniture stores has been the putting in of lines of talking machines, and meantime the interest of manufacturing has multiplied and increased at such a rate that it is difficult to keep up with it. In a way it bears some resemblance in its growth to the rapid growth of the automobile industry.

Incidentally, too, it may be remarked that to some extent the turning to talking machines for musical instruments is cutting into the piano trade, and veneer manufacturers are finding a somewhat reduced volume of business in piano veneers. It is not meant by this that the piano trade is a dead one, not by any means, for there will always be pianos made, and they will always call for the highest grade of veneer. Many people, however, who used to buy pianos took up with the player pianos, which were in outline the same, but different in detail. Meantime the talking machines were gradually making headway and being perfected mechanically, and seem to be overshadowing both pianos and player pianos in so far as the volume of new trade is concerned. Naturally this means some curtailment of what growth might have developed in the piano and player trade in the demand for veneer, but at the same time it has brought a volume of business much larger than the curtailment, and it is a business that comes more directly into the hands of the panel manufacturers.

Piano manufacturers, to quite an extent, work up their own veneer, but in the talking machine work there are only a few concerns who do their own work. The Victor people, who are conspicuous in this field, do their own work—that is, make their own cabinets as well as machines, and, incidentally, they put out a cabinet that is a pace-setter. The latest thing in the Victor cabinets is a seven-ply built-up case with shaped or swelled panels, both in the sides and in the front. This is the form of construction used in their high-priced instruments retailed at $300 and more. They are talking, too, of even greater elaboration than this in cabinet work, of turning out cabinets to retail as high as $3,000, which suggests that eventually this talking machine cabinet business may develop some of those fine cabinet or furniture features that will make

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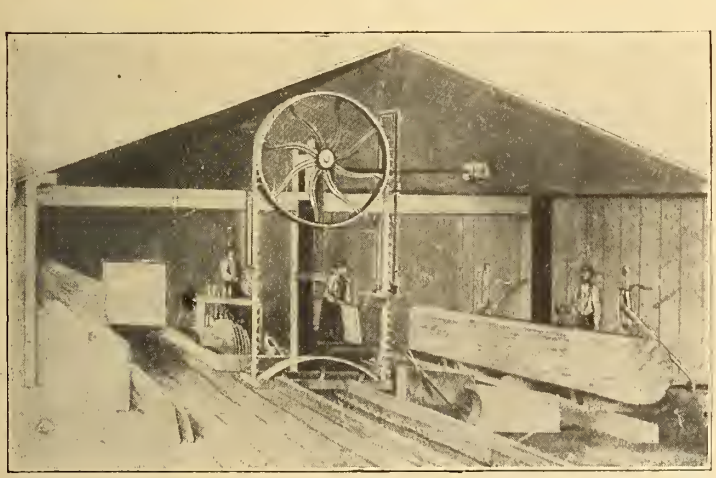

we have been devoting our energies to furnishing manufacturers of furniture and musical instruments with

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The Largest Poplar Veneer Mill in the World

THE CENTRAL VENEER CO., HUNTINGTON, WEST VIRGINIA

it a greater user of fine veneer than the grand pianos of the old days.

There are two general types of cabinets or cases for talking machines. One is the small, comparatively cheap cabinet that is designed to be set upon a table or stand. These are sometimes made of three-ply and sometimes five-ply. They range in size from 8 to 12 inches in height and from 1 to 1½ feet square.. They are comparatively plain, with a good grade of furniture face veneer used in the outside finish. The larger cabinets and the ones that are growing rapidly in favor are, roughly speaking, 4 feet high and 2 feet square. They are of varying designs, but in substance the average cabinet consists of panel sides and back and four doors in front. In outline it bears some resemblance to the old-time music cabinet, but there is some indication that radical changes may be developed in the design during the next few years, especially of the more expensive offerings. These larger cabinets are practically all five-ply work, and the panels vary in thickness from ⅝ to ¾ inch. One finds occasionally, in some of the more expensive makes, such as referred to above in the Victor types, some seven-ply work, and there will perhaps be more of this in the future.

The face veneer most seen in these cabinets is mahogany. Mahogany finds practically the same favor here that it has found in pianos and players in days gone by, and there is every kind of mahogany used, from plain stock to some with very fancy figure. Next in favor after mahogany comes oak, and it may be found in many finishes, including brown, mission, and gray. Walnut enters some, but so far does not seem to be as much esteemed in this work as it is in furniture. What it may do in the future remains to be seen. It is easily evident that if it continues popular in the furniture world, it will also find an echo in talking machine cabinet work. Gum is also making headway in this work, but so far has not received as much favorable notice as it has in furniture. One might perhaps safely predict that both walnut and figured gum will make larger showings in the near future. Birch, maple, and practically all the furniture and cabinet work woods are occasionally used.

The big feature of the year in connection with talking machine cabinets is in the work it has furnished to panel manufacturers. Many of the new concerns turning out talking machines have not undertaken to make their own wood work, but have contracted for it, some directly with people who buy veneer and make up finished cabinets, others with panel manufacturers for the built-up wood in the white form, while they assemble and finish the cabinets themselves. Several manufacturers formerly identified with other lines of work have taken up the making of cabinets for talking machines. Some of these make up their own work from veneer and others buy their raw material in the form of panels.

There are to be seen in the list of new enterprises some who formerly made pianos, some who were manufacturers of furniture, and one concern formerly conspicuous in the billiard and pool table line is now turning out a line of talking machines. The whole situation is in the growing stage yet, and one can only surmise as to the future.

Keep a watchful eye on costs, and frequently compare them with work actually done; then see to it that poor workmen and poor methods are promptly eliminated.

It's not the First Order that counts—

INVARIABLY we lose money on the first order we get from a customer. The profits are in most cases more than exceeded by the expense of getting that order—travelling expenses, salaries, and similar overhead expenses. **BUT** it is the repeat order that we strive for.

Having sold a customer his first order, how can we get him for his next? Only by giving him absolute satisfaction. That is why we carry a large stock at our warerooms for his convenience in selecting any particular figures he may desire. That is why his order, if it is sent in by mail or wire, receives careful and painstaking attention. That is why we always endeavor to ship all orders the day they are received. That is why we give a customer SERVICE, that we may get his second order, his third order, etc., and make him a regular customer.

We carry an extensive stock of Mahogany, American Black Walnut, Quartered Oak, Figured Quartered Gum, and Rotary Cut Veneers in Poplar, Maple, Oak, Gum, and Birch.

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OAK MAHOGANY CIRCASSIAN MAPLE

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BIRCH POPLAR CHERRY WALNUT GUM

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The Lumber Market

Domestic Woods

The only new feature in connection with the lumber situation in Canada is the improved service that the railways have been giving compared with the first two months of the year. Wholesale lumbermen still report that it is not a matter of getting orders, but of filling them. One wholesale lumberman interviewed stated that it had been almost impossible during the last couple of months to make shipments even when they had the stocks to fill the orders. The service given lately, however, has considerably improved conditions both for lumbermen and manufacturers.

Embargoes exist against Toronto upon the C.P.R. and G.T.R., but it is possible to obtain permits for shipments. The embargo on the Canadian Northern by connecting lines is still in force except east of Toronto. Grand Trunk embargoes have been lifted to a certain extent except east of Toronto. Permits for shipments are being accepted by the railway companies in practically all cases where purchasers can establish the fact that they need the stock for actual consumption.

Lumbermen report that furniture and piano factories are all busy, and are trying to lay in stocks for their 1917 requirements. Prices which were considered very high a short time ago are now general, and it looks very much as though to-day's prices will be increased before many weeks. Lumbermen are hesitating about contracting to sell extensive quantities for future delivery.

The Imperial Munitions Board, during the second week of April, let contracts for between 700,000 and 800,000 Bethlehem shell boxes. Orders for heavy ammunition boxes such as 8-inch and 9.2 are being cancelled where possible, but as the contracts for boxes for the smaller types of ammunition are being considerably increased, the shell box business is expected to become very active. Large quantities of lumber will thus be in demand. The Munitions Board are at present considering the adoption of a hardwood Bethlehem box. If this is adopted it will mean that large quantities of hardwoods will be used for shell boxes that were formerly available for manufacturers of regular lines, such as furniture, implements, etc.

The prices quoted at Toronto for car lots are practically the same as a month ago. These are: White ash, firsts and seconds, 1½ and 2 inch, $60; birch, firsts and seconds, inch, $44; basswood, firsts and seconds, inch, $48; soft elm, firsts and seconds, inch, $40; rock elm, firsts and seconds, 1½ and 2 inch, $55; soft maple, firsts and seconds, inch, $33; hard maple, firsts and seconds, inch, $40; Douglas fir, No. 1 and 2, 1 inch, clear, $44.50.

Imported Woods

The entrance of the United States into the war has had very little effect on the lumber industry. Practically every item in Northern and Southern hardwoods is firm in price, with no indication of a decrease. "Hardwood Record" sums up the lumber situation in the United States thus:

"In the north the season began with considerably less than normal stocks. On top of that the production of logs and lumber has been less than needed and, possibly, even less than normal, due as much to labor difficulties and shortages as to anything else.

"In the Southern sections the same conditions held through the winter. Now, as a matter of fact, advancing water and overwhelming rains have so soaked the logging districts, which in the main lie in the low grounds, that many mills are threatened with the prospect of immediate shutdown because they simply cannot get the logs in.

"In the Southeast, through the mountain country, an absolute dearth of shipping stocks prevails. Many mill people have, as a matter of fact, shipped beyond the quantities shown on their stock lists, and here, as practically everywhere else, many sales are being made practically from the saw. Also all sections continue to be oppressed by aggravated shipping conditions, and in several cases (and the tendency is growing) salesmen have been called in or have received orders to report in in the near future, as it is impossible to accept more business.

"There is scarcely an item that is not moving briskly. In the higher priced cabinet woods mahogany is practically shut off from Cuba on account of the revolutionary conditions, as it is from Mexico, while the African supply is more nearly approaching the status of Circassian imports month by month. Walnut has seen strong price advances, and, while there is ample supply for all needs, walnut producers are faced with the same general difficulties as manufacturers of other lines. Oak seems to have gotten itself back in a strong way, although it is reported not quite so brisk in some quarters as it was some time ago. Right on down the line, gum, birch, ash, poplar, cottonwood, and all of them are doing well, with every promise of doing even better. There is not a tangible indication on any horizon of the possibility of real mishap to the hardwood situation, and if there remains a buyer who is not now thoroughly convinced that he should buy when he has the opportunity, that man must have an overwhelmingly good supply of raw materials and an extraordinary vision and ample confidence in his own judgment."

Many embargoes that have restricted shipments have been raised, and lumber manufacturers are trying to rush consignments through to their customers. A feature of the hardwood market in the United States is said to be the excellent demand that exists for veneers and built-up woods of all descriptions. Owing to the activity in building operations in the United States, the higher grades of woods suitable for interior finish and for flooring are in demand, while the box-makers are seeking the lower grades.

There have been further price advances on a number of items during the last month, some items being $1 and $2 higher and others as much as $5 higher. Some of the prevailing quotations for Northern stocks in the Chicago market are as follows: Inch, firsts and seconds, $52; No. 1, $34; No. 2, $23; and No. 3, $17. Five-quarters, firsts and seconds, $56; No. 1, $39; No. 2, $25, and No. 3, $18. Hard maple, inch, firsts and seconds, $44; No. 1, $34; No. 2, $26; No. 3, $15. Eight-quarter, firsts and seconds, $54; No. 1, $44; No. 2, $32; No. 3, $17. Basswood, inch, firsts and seconds, $47.50; No. 1, $36.50; No. 2, $26.50; No. 3, $22.50. Five-quarter, firsts and seconds, $49.50; No. 1, $38.50; No. 2, $27.50; No. 3, $23.50. Soft elm, firsts and seconds, $42; No. 1, $32; No. 2, $22; No. 3, $18. Five-quarter, firsts and seconds, $47; No. 1, $37; No. 2, $25; No. 3, $19. Rock elm, 8/4, firsts and seconds, $59; No. 1, $49; No. 2, $30; No. 3, $21.

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Guarantee you an adequate and constant source of supply for

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Link your organization to ours—tie your factory to an establishment whose facilities and resources are so complete as always to be in a position to furnish your full requirements—let us blaze for you

An Open Road To Your Base of Supplies

This is but the foundation upon which ATCO EXCEPTIONAL SERVICE is based; for coupled with the facilities for service is the true desire to **Serve Well**—to furnish you lumber of the grade and quality your particular work demands—to give you an honest return for your investment.

This is what we mean by the If-I-Were-You Code—THE GOLDEN RULE STANDARD.

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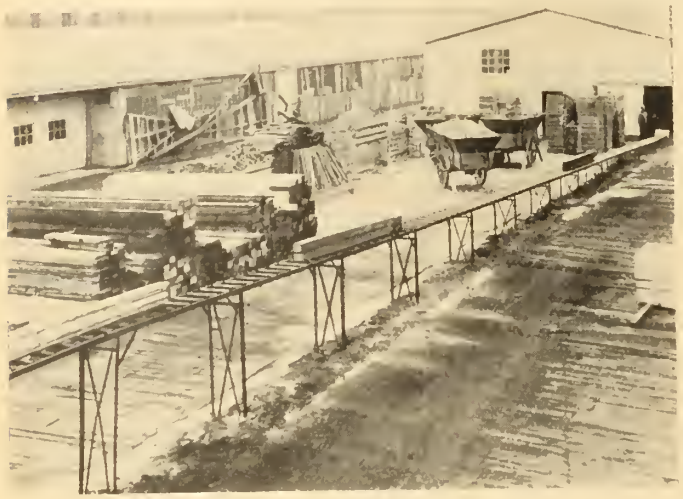
Cutting Costs in Handling Materials

The mission of the mechanical conveyer, briefly stated, is the conservation of time and energy, and we believe it is pertinent to ask if any manufacturer, in the face of present-day manufacturing costs, can afford to ignore these items.

Take, for instance, the handling of lumber when it is received at the manufacturing plant. In most cases it is loaded from the railroad car on to a smaller car, and then the small car is transferred by man-power to the location in the yard where the lumber is to be piled.



Mathews Gravity Single Roller Conveyer

The lumber then has to be unloaded from the car to the pile. All this work requires time and energy that has to be paid for. This, added to the original cost of the lumber, considerably enhances the cost of the finished product.

The makers of the Mathews Gravity Carrier (the illustrations show it in use) offer manufacturers a flexible system of handling lumber, boxes, box shooks, sash and doors, etc., which should materially reduce their costs. This carrier is made in two different types. The double-roller conveyer consists of two rows of

Unloading planks from car with a double roller conveyer

rollers, the roller surface being approximately 14½ inches wide. The rollers are assembled alternately, 12 inches from centre to centre, giving 6 inch centres on the centre frame rail. The rollers are not placed at exact right angles with the frame rails, but slanted slightly so that planks, lumber, etc., are forced to the centre. This type of conveyer is used for carrying all widths and lengths of lumber, dimension stuff, planks, etc.

The single roller flanged conveyer is made in any desired width, but for wood stock wider than fourteen inches the company recommend their double-roller type. The single-roller type is fitted with ⅜-inch flanges, which revolve with the rollers, preventing materials from leaving the conveyer and aiding the forward movement by gravity. Rollers can be spaced any desired distance apart from 3 inches between centres up to 24 inches between centres. The spacing of rollers is determined by minimum lengths and maximum weights to be handled. The standard lengths of units are four and eight feet.

The rollers used are cut from cold-drawn steel tubing 2½ inches in diameter, and are fitted with ball bearings. Axles extend through rollers, the ends being firmly secured in slots cut in the frame rails. The framework is strong and rigidly braced. Each unit is provided with interchangeable couplings, permitting quick assembly when the equipment is used portably.

To convey materials between the objective points it is only necessary to assemble as many standard units as will cover the distance, allowing a down-grade in the direction of travel of 4 per cent., or one-half inch fall to the foot. The company manufacture steel adjustable jacks in five standard sizes for supporting the conveyers. They state, however, that wooden supports can be used if desired, but they recommend the adjustable jacks, especially where the conveyer is to be moved around.

The principal points in favor of the Mathews gravity carriers, as enumerated by the company, are: "Demurrage charges are saved by releasing cars quickly; greater storage capacity is provided, as conveyers will operate in narrow spaces where wagons and trucks cannot go; every moment of labor is made productive, and there is no waste time consumed in handling materials between objective points." These are reasons that should appeal to manufacturers. Complete information about the Mathews gravity carriers can be secured by sending a rough sketch giving details of your requirements to the company at 484 Richmond Street West, Toronto.

Dodge Manufacturing Company Doing Extensive Business in England

The Dodge Manufacturing Company, Toronto, report that they are finding a good demand for the Dodge standard wood split pulley in England, and that they are making extensive shipments to that country. In order to keep pace with their growing trade they have now found it necessary to extend their facilities for the manufacture of their pulleys. Their export business, being based upon the merit of the pulleys, is of a permanent nature, rather than of a temporary character arising out of the present abnormal conditions in the old land. It is gratifying to note this instance as evidence of the ability of Canadian manufacturers not only to hold their home markets, but to excell to the extent of being able to compete successfully abroad.

We get few good things in this world without trouble, but get lots of trouble without any good things.

Don't neglect your business, for by so doing you are playing right into your competitor's hands.

FOR SALE!

1 car Quartered White Oak

4,750′ 1 x 4 and up 55 ins. long
4,700′ 1 x 4 and up 49 ins. long
2,500′ 1 x 4 and up 46 ins. long
2,500′ 1 x 4 and up 43 ins. long
All clear 1 face.

1 car 1 x 4 and up 22″ and 25″ long Qtd. White Oak
Clear 1 face.

2 cars 2 x 2—30″ Clear Oak Squares
1 car 2 x 2—19″ Clear Dry Oak Squares
2 cars 2 x 2—8′ Clear Sap Gum Squares
2 cars 2 x 2—4′ Clear Sap Gum Squares
2 cars 2 x 2—30″ Clear Sap Gum Squares

1 car 2 x 2 and 2½ x 2½—28, 30 and 32 in. Clear Dry Ash Squares

1 car as follows:
6500 pcs. 2 x 2—30″ Clear Gum, Oak and Ash Sqs.
1000 pcs. 2½ x 2½—30″ Clear Oak, Gum and Ash Squares.
4400 pcs. 2 x 2—40″ Clear Oak, Gum and Ash Sqs.
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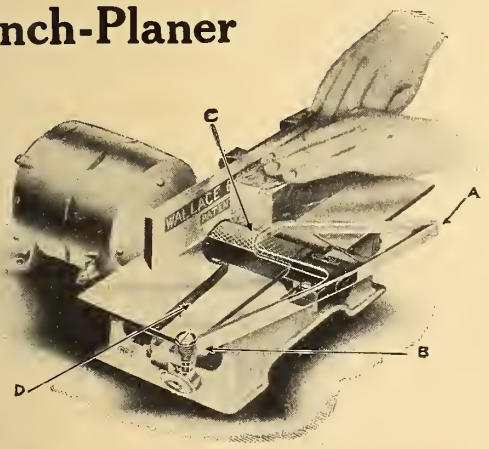

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Eighty per cent. more work with greatly reduced effort. Uniform, machine-like precision in results. This efficiency machine will supersede the Jack Plane wherever it is given a trial. Light weight—portable—safe—inexpensive.

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70 M′ 1 x 4 and up No. 3 Com. Dry Birch.
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2 cars 4 x 6 Birch and Maple Hearts.
45 M′ 10/4″ No. 1 Com. and Btr. Dry Birch.
4 cars 4/4″ No. 3 Com. Dry Hard Maple.
16 M′ 4/4″ No. 2 Com. and Btr. Winter Cut Hard Maple.
1 car 6/4″No. 2 Com. and Btr. Dry Hard Maple.
1 car 6/4″ No. 1 Com. and Btr. Dry Hard Maple.
26 M′ 8/4″ No. 1 Com. and Btr. Winter Cut Hard Maple.
12 M′ 12/4″ No. 1 Com. and Btr. Winter Cut Hard Maple.
1 car 4/4″ No. 2 Com. and Btr. Beech.
2 cars 4/4″ No. 2 Com. and Btr. Dry Soft Elm.
1 car 6/4″ No. 1 Com. and Btr. Dry Soft Elm.
33 M′ 4/4″ No. 2 Com. and Btr. Black Ash.
30 M′ 6/4″ No. 2 Com. and Btr. Winter Cut Bass Wood.

Also the following

CRATING

1 car 1 x 3 Spruce Crating.
1 car 1 x 4 Spruce Crating.
4 cars 1 x 4 and up Spruce Crating.
4 cars 5/8 x 3 and up Merch. Spruce.

We can give you prompt service

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and
Deer Lake, Ont.

Falls Efficiency and Safety First Club

The Falls Machine Company of Sheboygan Falls, Wisconsin, have in connection with their plant a club known as the Falls Efficiency and Safety First Club, the object of which is to promote a spirit of co-operation among employees and between employees and officers of the company. Inspeaking of the club, the company say:

"We do not claim that we have solved the problem of co-operation, but we do know that we have proceeded in the right direction, so far as we have gone, and we believe that finally we shall succeed in creating the proper standard between employer and employee. This is the end we have in view, and as the desire toward this end is a predominating desire with us, we feel accomplishment is merely a matter of time.

"Our belief is that expressed by many. We know that every man is endowed with brains, and appreciate, further, that in the course of events it will come to pass that employees' brains will prove more valuable to them and to us than the work their hands and feet perform by direction of the brains of others. Civilization creates a desire for education, and the more educated workmen become the greater will be the responsibilities and worries of the mind of the employer who fails to interpret the trend of the times.

"We want our employees to think and act for themselves. We encourage them to do this. Their responsibility is our responsibility, and if they are of proper calibre, absolutely nothing prevents their attaining any goal they strive for in our organization.

"The Falls Efficiency and Safety First Club was organized with the object of creating at once a capable body of men to suggest and carry out safety recommendations, to plan and create methods whereby plant efficiency would be increased, and, last, to promote a sincere feeling of good fellowship between employer and employee.

"Our club is a very successful part of the organization; it has proven of immense benefit to all in a good many ways, and as it grows its value to this corporation will become greater.

"In conducting our meetings, which occur once each month, we invite and expect discussions from all members. Any recommendations or suggestions are passed upon immediately. We also invite and secure the services of specialists in safety work, liability insurance, etc., to address the club on subjects peculiar to them and of general interest to all members.

"All officers of the corporation are honorary members, and are well pleased with the many benefits so far derived from the club. The membership is not compulsory, nor does it need to be, for those who belong feel they cannot afford to miss a single meeting."

A. B. Maine with Perkins Glue Company

The Perkins Glue Company, with factory at Lansdale, Pa., and sales offices at South Bend, Ind., has found it necessary to increase its force, and among the additional men taken on is Mr. A. B. Maine.

Mr. Maine, who becomes affiliated with the sales department, is no stranger to the trade he will visit. He has had twelve years' experience in the woodworking field, and, because of exceptional opportunities, has been able to study operations in all departments of the several industries. Entering the employ of Library Bureau, Boston, Mass., manufacturers of high-grade office and library equipment, in 1904, he was successively laborer, bill clerk, stock clerk, manager of stock room, and estimator. In 1911 he accepted a position as cost accountant in the chair factory of John A. Dunn Company, Gardner, Mass., and the following year was transferred to the company's branch at St. Paul, Minn. In December, 1913, he joined the staff of the Furniture Manufacturer and Artisan, Grand Rapids, Mich., and covered factories in the Middle West. In January, 1916, he was employed by the Berlin Machine Works, now known as P. B. Yates Machine Company, Beloit, Wis., as production expert, and in that capacity visited factories east and west. While Mr. Maine's first motive in calling on the trade will be to further promote interest in the patented vegetable glue the company makes it is also felt that because of his broad experience he will be able to render some service to manufacturers who desire to discuss problems having to do with economical production in any department.

Huge Tanks for Pulp Industry

The Canadian Pipe Company, Ltd., Vancouver, B.C., recently turned out a number of tanks for Ontario and British Columbia pulp companies, which Manager McGregor describes as easily exceeding in size and massiveness anything in the way of a circular wooden container ever manufactured in that province up to the present. Four tanks for Ontario customers were each 26 feet in diameter by 20 feet in height, inside measurement; the side material was 6 x 8 inch clear fir, while bottoms and heads were 6 x 6 inch stock. Five tanks were built to the order of Pacific Mills, Ltd., for their Ocean Falls plant; three of these were each 26 feet in diameter by 24 feet high, made of 6 x 6 inch clear fir, with bottoms and heads of the same thickness. Two were even larger—28 feet diameter and 28 feet high, 6 x 6 inch stock for sides, bottoms, and heads. The latter are blow-pit tanks and have false bottoms of three-inch material set at a slight angle, each bottom being perforated with nearly 20,000 holes tapered from ⅛ to ⅝ inches, and each seared with a red-hot iron to harden the wood roundabout. An average of 25,000 feet of lumber was required for each tank.

Book on Carpentry

The Manual Arts Press, Peoria, Ill., are the publishers of a new book entitled "Carpentry." The author of the book is Ira S. Griffith, chairman of the Manual Arts Department of the University of Missouri. Mr. Griffith has had considerable practical experience as a carpenter, and this experience, together with his technical knowledge has enabled him to deal with his subject in a very thorough manner. There are seven chapters in the book, and such work as laying out for foundations, making forms for concrete, main framing, roof framing, exterior covering and finish, interior finish and estimating are gone into in great detail. There is also an appendix, which explains a good many short cuts to roof framing, besides giving a number of useful tables. This book will form a very useful addition to the library of any carpenter, apprentice or manual training student. It is 8 inches by 5½ inches, nicely bound, and is offered for sale by the publishers at $1.

It seems to us there is a great deal of human nature in varnish. Sometimes the more you work it the worse it gets, or should you mate it with an unsuitable partner, it is apt to go wrong very quickly.

Get Prices from

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BETHLEHEM SHELL-BOX HARDWARE

before placing your order

We are sole selling agents for the Toronto Lock Mfg. Company who have been making shell box hardware for over two years. The Galvanized Tie Rods, Lid Plates, Bottom Plates, Wing Nuts, Split Rings, Chain and Cotter Pins which are made by this firm for Bethlehem Shell Boxes have proved their worth by the large orders which have already been filled for this equipment. We can also supply you with Double Stranded Galvanized Wire, Galvanized Staples, Nails and Wood Screws.

Get our complete Catalogues of:

BUILDERS' HARDWARE FACTORY and MILL SUPPLIES
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CABINET HARDWARE
FIRE DOOR, GARAGE and STABLE HARDWARE

We Specialize in

MADE-TO-ORDER HARDWARE

Canadian Agents for

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If it's Hardware—Write Us.

THE
VOKES HARDWARE CO.
LIMITED

40 Queen East
TORONTO CANADA

News of the Trade

The Montreal Feather and Down Company, Ltd., has been incorporated at Montreal.

Mickle, Dyment & Son have commenced to manufacture toys at their plant at Brantford, Ont.

The Classic Phonograph Company has succeeded the Ideal Furniture Company, of Breslau, Ont.

The Goderich Dry Dock and Shipbuilding Company are now purchasing materials for the erection of their plant at Goderich, Ont.

The Carnes Artificial Limb Company, a United States firm, has been licensed to manufacture and sell artificial limbs in Ontario.

The Dominion Hardwoods, Ltd., are contemplating the installation of an enamelling plant at their large handle factory at Deseronto, Ont.

The Western Canada Stave Mill, on Rainy River, Ont., is being put in order for the season's work. For the present it is expected that the factory will turn out heading.

The cabinet making business of W. H. Harmer & Co., of Cochrane, Ont., has been taken over by W. H. Harmer & Co., Ltd. The capital of the new company is $40,000.

George Simpson is erecting a sawmill to run in connection with his box factory at Selkirk, Man. This will enable him to manufacture the lumber used in making boxes.

The butter box factory of the Canadian Box Company, D'Israeli, P.Q., was recently damaged by fire. The loss is estimated at $20,000, with insurance amounting to $10,000.

The Timberland Lumber Company, of New Westminster, B.C., who are erecting a large timber plant on the Fraser River, are expected to add a box factory and also possibly a sash and door factory.

The Kingsdale Box Company, Ltd., have recently been incorporated, with capital of $60,000, to take over the lumber and woodenware business formerly carried on by Messrs. Ross & Branscombe, at Kingsdale, Ont.

The Northern Toys and Turning Company, Ltd., 703-704 Power Building, Montreal, are contemplating the erection of a factory, to cost $100,000. The company are as yet undecided where the factory will be located.

The International Shipbuilding Corporation, Ltd., of Newcastle, N.B., are contemplating the erection of a shipbuilding plant, to cost $2,000,000. The head office of the company is at 323 Transportation Building, Montreal.

The McCallum Manufacturing Company, 1463 Davenport Road, Toronto, has been reorganized. A new partner has been taken in and a quantity of new machinery added to the plant. The company will manufacture sash, doors, interior fittings, and woodenware.

At a meeting of the North Bay Town Council it was decided to submit a by-law to the ratepayers authorizing the guaranteeing of bonds for the sum of $15,000 to the J. P. Quinlan Manufacturing Company. The company intends to manufacture furniture, school and church fittings, etc.

A new addition to the talking machine industry in Canada is "Auronolas Limited," of Aurora, Ont. This company has been organized, with capital of $40,000, to manufacture talking machines, music cabinets, talking machine records, etc. Among those interested are S. King and O. H. King, of Toronto.

The Canadian Feather and Mattress Company, of Toronto, have secured control for Canada of the new bedding material known as "Agave" hair. This material is a vegetable fibre, grown in Central America. It is both air and kiln-dried before being used for mattresses and other bedding material. Its chief characteristic is said to be its great resiliency.

The death occurred recently of Mr. John R. Sanderson, of Brantford, Ont. Mr. Sanderson was prominently identified with a number of Brantford's leading industries. He was president and general manager of the Adams Wagon Works, and president of the Brantford Carriage Company. Although Mr. Sanderson had been ailing for some time, his death was not expected.

Wilson Brothers, Ltd., Collingwood, Ont., whose plant was recently destroyed by fire, are cleaning up the debris as rapidly as possible, and expect to rebuild at an early date. Several large contracts which they had in hand at the time of the fire have been placed with outside firms to complete. One of these was for a large amount of work at Camp Borden. The destruction of the Wilson Brothers' plant left Collingwood and its vicinity without any planing mill, and the growth of the district makes it essential that one should be established without delay. On account of the activity of the shipbuilding plant at Collingwood and other important industries, there is now a great insufficiency of house room in Collingwood, and a large number of houses were to have been built this summer. Mr. Wilson and Mr. H. A. Currie are the directors now in charge of the business.

Appreciates Information Furnished

Three Rivers, Que., March 17, 1917.

The Woodworker Publishing Company, Ltd.:

Dear Sirs,—We received from you on the 24th of October last a card informing us that the Muskoka Lakes Navigation and Hotel Company was in the market for steamboat chairs. We have received an order from them to-day. Thank you for the information.

Please find our subscription herein enclosed.

Yours truly,

C. P. Gelinas & Frere, Ltd.

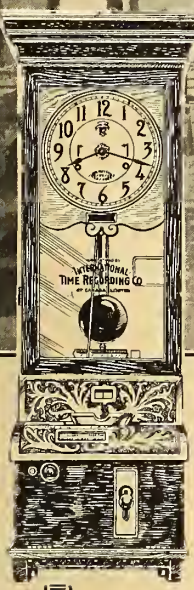
Opens Montreal Office

Graves, Bigwood & Company, manufacturers of pine, hemlock and hardwood lumber, with head office at 712 Traders Bank Building, Toronto, have opened a branch office in Montreal at 327 Coristine Building. Mr. C. Villiers will be in charge.

Save the Waste from the Spray

Seemingly it is a fact not generally known that the waste varnish from the spray can be cleaned and used again. The writer found a piano manufacturer in Indiana who saves all the waste varnish from his sprays and send it back to the Sherwin-Williams Company, Cleveland, O., where, for every barrel of waste, he receives two barrels of varnish, by the payment of $1 a gallon. This is considered a good proposition by him. Perhaps other users of the spray, who do not already know of it, will be interested in the idea.—Waldorf, in "The Woodworker" (Indianapolis).

To maintain a trade or profession in its most profitable channel the exponent must cultivate business qualifications and put them in force at every opportunity.



Where is the most time Lost?

Careful investigation has proven that the greatest loss is between the time your employes enter your plant and the time they START TO WORK, or between when they stop work and LEAVE YOUR PLANT.

This, in addition to employes coming late, constitutes one of the greatest losses to the employers of labour.

An "International" Time Recorder protects YOU against this loss

A glance at the time cards tells you instantly just what time each employe enters your plant. If he enters at the exact starting time, it is apparent that he did not start work ON TIME.

If your payroll is only $200 a week, it is an item annually worthy of the most careful checking. Multiply this item according to your own payroll and it will impress on you the greater importance of it.

International Time Recorders are built to suit every kind of business.

We are the largest manufacturers of time recording devices in the world.

You can purchase a first-class time recorder from $100 up.

Let's help you solve your time-keeping problem. Our thirty years' experience will prove invaluable to you. If you will stop to figure what it may be costing you to be without a modern time-recording equipment, you will probably wire to have one shipped you by express. At least, it will pay you to write to-day for further particulars.

The International Time Recording Company of Canada, Limited

Montreal Office
W. A. Wood, Jr., Cartier Bldg., 212 McGill St.

TORONTO
F. E. Mutton, General Manager, Anderson and William Sts.

Winnipeg Office
George Morris, 400 Electric Railway Chambers.

VANCOUVER OFFICE—R. Donohoe, 817 Pender St. W.

WANTED

Man to run No. 90 Yates Matcher, also men for other factory positions and saw mill. Apply, stating wages desired, to The C. Beck Mfg. Co., Ltd., Penetanguishene, Ont.

The Manufacture of Matches

A recent issue of "The Timber Trades Journal" describes the manufacturing of matches as follows:

The wood employed for splints must be very straight-grained, and is chiefly white Canadian pine and aspen. It is best cut into splints while still green; otherwise it must be steamed. One or other of two methods is mainly practised. In Sweden and in parts of Germany a continuous band of veneer as thick as a match is "turned" off the rotating log by a steadily advancing knife, and cut lengthwise into ribbons as broad as a match is long, the splints being subsequently chopped off the ends of a layer of these ribbons by means of a guillotine knife. By the other method, mainly adopted in Britain, the timber, after trimming, is sawn into rectangular billets $4\frac{3}{4}$ inches long in the direction of the grain, which billets, by two slicings at right angles, are made to yield splints that are thus equal in length to two matches of $2\frac{3}{4}$ inches. In "frame dipping" the splints, after drying, are filled by machine into rectangular "dipping frames" (holding, say, 4,000), where they are clamped slightly apart from each other, and, if of double length, with one end projecting on each side of the frame. In the more recent method of "coil dipping" the splints are dropped continuously from a hopper at short regular intervals on to a running belt, each end of the splint projecting over the sides of the belt. The belt is wound into a coil, whipping in with it the splints, which, since the belt itself is as thick as a match, appear as a forest of stumps separated from one another by the proper distance. Whether in frame or in coil, the splints are then heated (to favor absorption) and dipped into the paraffin bath first one end and then the other.

In American practice the process begins with the sawing into suitable lengths of the log from which the sticks are to be cut, and the peeling—by hand—of the outer bark. The peeled sections are then placed in a veneer-cutter which strips off a thin, continuous sheet of wood in the form of a veneer, and this in turn is cut into the minute sticks which need only to be tipped with the ignition points, and packed in boxes. The tipping process is done without any hand labor, the sticks being inserted in perforated holders by an ingenious mechanism, and then carried on an endless belt into the ignition mixture, where each stick automatically receives the ignition point.

Wood Seasoning Problems

One of the serious problems connected with the drying of western woods, particularly sugar pine, is a peculiar brown stain which develops during seasoning. This staining on otherwise perfectly white lumber occasions a loss of thousands of dollars annually to the manufacturers. In an effort to establish some method of kiln drying whereby this difficulty would be eliminated, the Forest Products Laboratory at Madison, Wis., secured a carload of sugar pine logs and made test runs in the laboratory kilns. The results of these runs have indicated a method whereby it is thought a solution of the problem has been found. Similar experiments will be made on Idaho white pine and western yellow pine to establish a satisfactory method of drying.

Durability of Timbers

About 1,500 pieces of wood representing fifty different species are under test by the United States Government to determine their relative durability. At the end of three years, all of the conifers with the exception of cypress, redwood, yew, and the cedars have decayed. Most of the hardwoods have entirely rotted. Tests to determine the effect of various amounts of resin in the southern pines upon their durability have yielded results which indicate that the durability of these woods does not depend directly upon their resin content.

Can Dry Lumber Quickly

The Government Forest Products Laboratory at Madison, Wis., has recently completed a series of experiments in its dry kiln which demonstrates that hemlock lumber can be dried within forty-eight hours taken green from the saw. The test shows that structural material can be dried without checking within six days. If the work of the laboratory can be applied commercially at the mills of that territory it will mean a big saving, since at present from three to six months are required to dry lumber.

Timber in Oregon

The State of Oregon claims to have within its borders one-sixth of all the standing timber in the United States. Nearly one-half of this timber belongs to the government. Nearly half of the persons employed in the State are in some branch of the lumber business, and they receive $15,000,000 annually as wages.

WATCHMAN'S CLOCKS
Hardinge Portable
The only unlimited System.
Patrol clock, each $39.60 complete.
Stations, any number needed $4.10.
Also Key Type Clocks, limited capacity.
F.O.B. Toronto. Write for catalogues.
SIGNAL SYSTEMS, LIMITED
110 Church Street - - Toronto

PETRIE'S
MONTHLY LIST
of
NEW and USED
WOOD TOOLS
in stock for immediate delivery

Wood Planers
30" Whitney pattern surfacer.
26" Revolving bed single surfacer.
26" Revolving bed double surfacers.
24" Galt, revolving bed.
24" Single surfacers, various makes.
22" Stationary bed surface planer.

Band Saws
42" Fay & Egan power feed rip.
36" Crescent, pedestal.
30" Ideal pedestal, tilting table.
26" Crescent pedestal (2).
20" Crescent pedestal (2).

Saw Tables
No. 2 Crescent, combination.
No 5 Crescent, sliding top.
Ballantine variable power feed.
Preston variable power feed.
Cowan heavy power feed, M138.
12' Defiance automatic equalizer.
MacGregor Gourlay railway cut-off.
6' Crescent iron frame swing.

Mortisers
Cowan hollow chisel, M190.
Galt upright, compound table.
Fay graduated stroke.
No. 2 Smart foot power.
No. 1 Smart foot power.

Moulders
13" Clark-Demill four-side.
12" Cowan four side.
10" Houston four side.
6" Cowan four side.
6" Dundas sash sticker.

Sanders
24" Fay double drum.
12" C.M.C. disk and drum.
18" Crescent disk, adjustable table.

Clothespin Machinery
Humphrey No. 8 giant slab resaw.
Humphrey gang slitter.
Humphrey cylinder cutting-off machine.
Humphrey automatic lathes (6).
Humphrey double slotters (4).

Miscellaneous
Fay & Egan 12 spindle dovetailer.
MacGregor Gourlay 12 spindle dovetailer.
Cowan dowel machine, M80.
Cowan post boring machine, M85G.
Cowan post boring machine, M23.
Galt blind slat re-saw.
Cowan sash clamp.
Egan sash and door tenoner.
No. 6 Lion universal woodtrimmer.
Single spindle wood shaper.
48" 3 saw edger.
20" American wood scraper.
16" Ideal wood lathes (3).
4-head rounding machines.
Cowan spindle carver, M63.
Cowan veneer press screws.
Dunbar automatic shingle machine.
No. 1 Hart automatic saw filer.

Prices, Descriptions and Full Particulars on Request

H. W. PETRIE, LTD.
Front St. W., Toronto, Ont.

Don't Take Chances

on your

Veneer Tapes

Obtain the tape best suited for your requirements by taking up with the

Veneer Tape Specialists

Ideal Coated Paper Co.

Mills and Main Office:

Brookfield - Mass.

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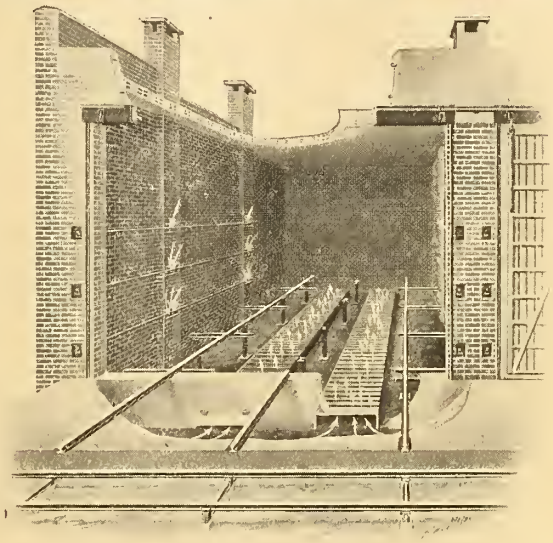
Why risk partial satisfaction when National Dry Kilns are available?



Some other kiln might do your work, but National Kilns will surely do it.

You might be satisfied with another, but you will be enthusiastic over your NATIONAL.

THE NATIONAL DRY KILN CO.

1117 East Maryland St., INDIANAPOLIS, Indiana

COMPLETE BENDING EQUIPMENT

For Automobile—Wagon—Vehicle Felloes—Hounds and Sled Runners. Located — Kile Mfg. Co., Akron, Ohio, which concern have recently discontinued. Everything well taken care of and very fine shape. Cost new to-day over $10,000.

1—No. 50 Defiance Extra Heavy Felloe, Hound and Bow Bending Machine. Bends from 13½ in. up to 72 in. circle, up to 6 in. thick and 12 in. wide; bends bows 36 in. to 44 in. wide; capacity sufficient to bend 500 forms of medium-sized stock in ten hours; completely equipped—excellent condition; weight 7,900 pounds.

20—Defiance Collapsible Bending Forms. One each:

17 in.	24 in.	33 in.	42 in.
19 in.	26 in.	34 in.	44 in.
21 in.	28 in.	36 in.	45 in.
22 in.	31 in.	38 in.	47 in.
23 in.	32 in.	40 in.	49 in.

2—Defiance Hound Bending Forms.

32—Pieces Special Strap Steel, 14 in. wide, 4½ ft. long.

20—Pieces Special Strap Steel, 13 in. wide, 4 ft. long.

70—Pieces Special Strap Steel; punched for ends; 12 in. wide, various lengths.

About 600—Malleable Iron Shackles.

About 100—Sled Runner Shackles.

About 50—Sets End Castings.

1500—Wood Head Blocks (in various lengths).

870—12 in. Bending Straps. Are complete and fitted with end castings.

90—42 in.	70—60 in.	36—79 in.
85—46 in.	40—66 in.	67—84 in.
46—48 in.	47—68 in.	57—88 in.
135—52 in.	28—70 in.	22—96 in.
52—55 in.	67—74 in.	20—120 in.
		8—132 in.

64—Bending Straps—13 in. All complete and fitted with end castings.

23—55 in.
24—64 in.
17—68 in.

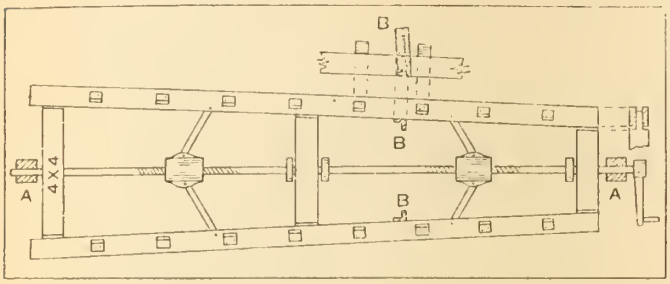
PRICE, for complete equipment, as above enumerated, $3,000.00

Write quick—Subject prior sale

Wayne Machinery Company, FORT WAYNE INDIANA

Assembling and Clamping Ladders

With the home-made device shown in this figure one can assemble, clamp, and nail ladders very rapidly. The long central shaft is supported by the end posts, A A. A light, hinged brace holds the whole affair in a level, horizontal position for assembling and clamping. The ladder is squared by pressing one of the treads against the projecting irons, B B.



Frame for clamping up ladders

After clamping the ladder together the clamp is turned first to one edge, then the other, so the steps can be nailed or screwed to the sides. When the clamp is thus on edge, the lower side rests upon a supporting timber, which steadies it while the ladder is being nailed together.—"The Woodworker" (Indianapolis).

What makes us remember a tune, a verse, a proverb? The fact that we hear it again and again. What makes people remember a manufacturer's goods? The fact that they see them advertised again and again.

Opportunities that have passed seldom come back to the man who waits.

"SPECIAL"

Important Used Machines For Sale.
Wil Pay to Inquire.

Chain Saw Mortisers (3).
42-in. Royal Invincible 3-Drum Sander.
60-in. Columbia 3-Drum Sander.
Berlin Matcher No. 94.
Berlin Band Resaw, 54 in.
Mereen Horizontal Resaw.
Schimmel-Reid Belt Sander.
Hayes Double End Tenoner (best made).
American Sash Dovetailing Machine.
Heald Sash Trimmer.
Hayes Dowel Door Outfit (capacity 1,000 doors per day), and many other fine used machines, Moulders, Power Feed Rip Saws, etc., etc.

WRITE NOW.

J. L. NEILSON & CO.
WINNIPEG, MAN.

The New Hoosier Self-Feed Rip Saw

This is our Standard or No. 1 Hoosier Self Feed Rip Saw, which is now built with hinged upper feed works so that they can be quickly and easily raised up out of the way and the machine used for hand-feed work.

The machine is capable of ripping as thick as 6 in. and as wide as 17 in., and can be used for single, gang, or bevel ripping, the feed being strong enough to pull six saws through 1 in. stock. Four rates of feed are provided from 35 to 150 ft. per minute.

To take care of special ripping problems we build Hoosier Rip Saws in seven other styles.

For further information address

The—
Sinker-Davis
Company
INDIANAPOLIS, IND.

PERIOD CARVINGS FOR FURNITURE

We have published a new complete catalogue.

Will send on request.

DECORATORS SUPPLY COMPANY
Archer Ave. and Leo St. CHICAGO, ILL.

Subscribers' Information Form

Many letters reach us from subscribers enquiring where a certain machine, a certain kind of lumber or veneer, or some other class of goods, can be obtained. We can usually supply the information. We want to be of service to our subscribers in this way, and we desire to encourage requests for such information. Make use of this form for the purpose.

Date.....1917

CANADIAN WOODWORKER
AND FURNITURE MANUFACTURER,
345 Adelaide Street West, Toronto.

Please tell us where we can procure .....

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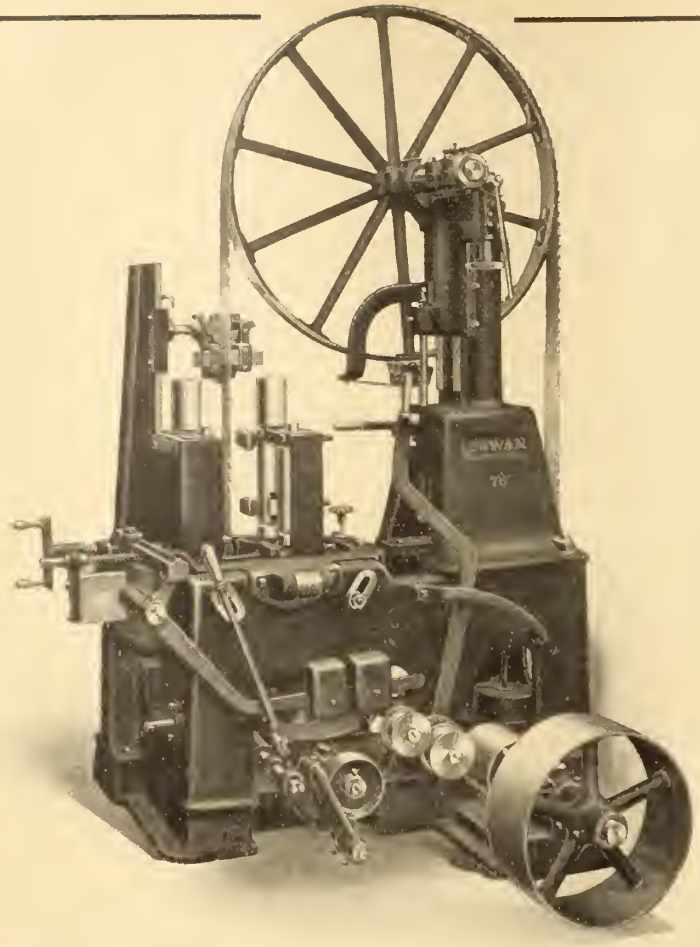
Name .....

Address .....



You cannot afford to decide your

RESAW

proposition without giving our line serious consideration. We manufacture a variety of sizes and types, but can only show one here, which is our

M 76—48″ Wheels

Other Resaws we manufacture, of which we will be pleased to send full particulars on request:

M 171—42 in. Wheels
M 219—48 in. Wheels
M 67—54 in. Wheels
M 170—60 in. Wheels

This latter made with or without lever set works.

COWAN & COMPANY OF GALT, LIMITED

Galt, Ontario - Canada

Perkins Vegetable Glue

The Best for Built-up Stock and Veneer Laying

Dinner wagon manufactured by the D. Hibner Furniture Co., Limited, Kitchener, Ont., in which Perkins Glue was used.

Perkins Vegetable Glue sticks and holds. It is unaffected by dampness, extremely dry atmosphere or severe sanding. We guarantee to effect a 20 per cent. saving in your glue room by replacing hide glue with Perkins Vegetable Glue. Along with this saving you can have a glue room comfortable as to temperature and sweet as to smell. The glue is absolutely uniform in quality. Every shipment exactly the same. Let us demonstrate in your own factory and on your own stock just what can be accomplished with Perkins Vegetable Glue.

PERKINS GLUE COMPANY, LIMITED, HAMILTON, ONT.

"Address all inquiries to Sales Office, Perkins Glue Company, South Bend, Indiana, U. S. A."

Falls

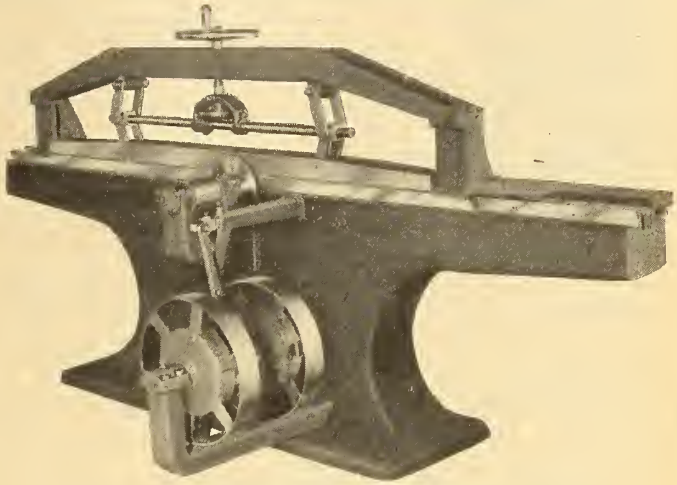
If You Lay Butt Joints In Fine Figured Veneers *You Need This Machine*

Quality Joints

Your troubles in making perfect joints with end-grained, cross-grained, and fancy-figured veneers will vanish if you have this machine to help you.

The veneers are held firmly by the clamp, and the saw trims them accurately, making the matching and laying an easy matter.

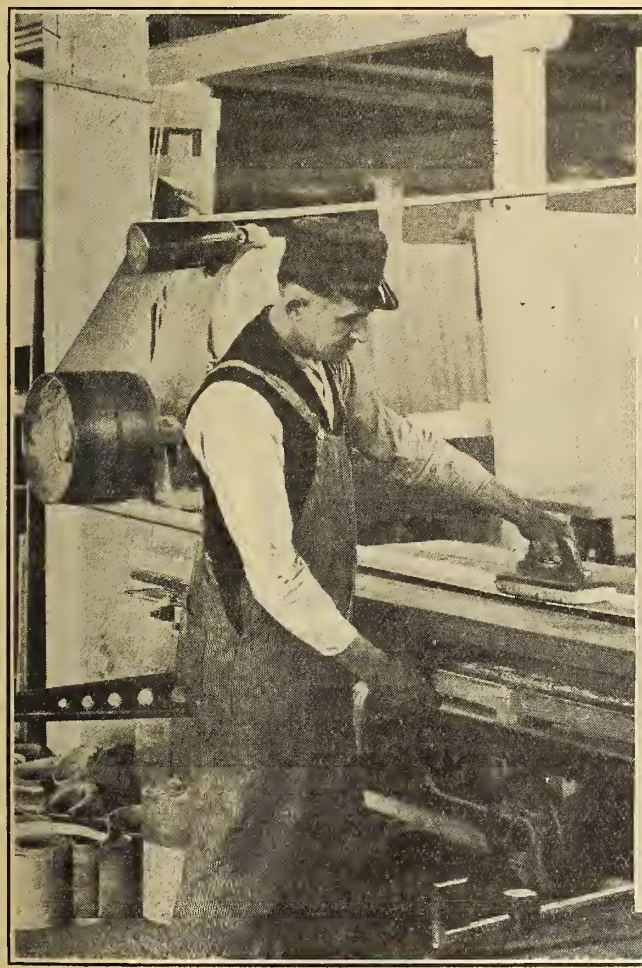
It is the only machine that can be relied on if you are manufacturing high-grade goods.



No. 23 Automatic Veneer Jointer.

Falls Machine Co.
Sheboygan Falls - Wis., U.S.A.

Canadian Representatives:
Garlock-Walker Machinery Co.
32 Front St. West - TORONTO, CANADA



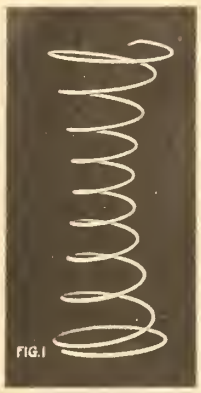
Carborundum Brand Garnet Paper and Cloth are Uniformly Graded—Absolutely so

YOU can always depend upon Carborundum Brand Garnet products—they are uniformly coated with uniformly graded North River Garnet. ¶There is never any coarse grain to leave heavy deep scratches on the work. The paper or cloth will not fill because it is uniformly coated with free, clean cutting grain.

Carborundum Brand Garnet Products are Uniform—Absolutely so

May we send you sample sheets for trial?

THE CARBORUNDUM COMPANY
NIAGARA FALLS, N. Y.
NEW YORK CHICAGO PHILADELPHIA BOSTON CLEVELAND CINCINNATI
PITTSBURGH GRAND RAPIDS MILWAUKEE



HIGH GRADE SPRINGS

for all kinds of Upholstery Work

Constructions for Chairs, Davenports, Carriages and Automobiles.

"Fosters" Multi-Springs and Luxury Springs

Spring Filling for Top Cushions

The service resulting from 30 years' experience is at your command.

We solicit your inquiries and an opportunity to submit samples.

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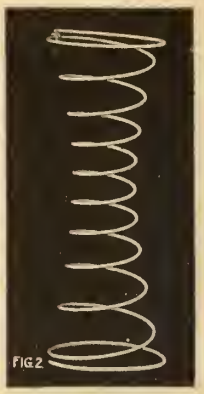
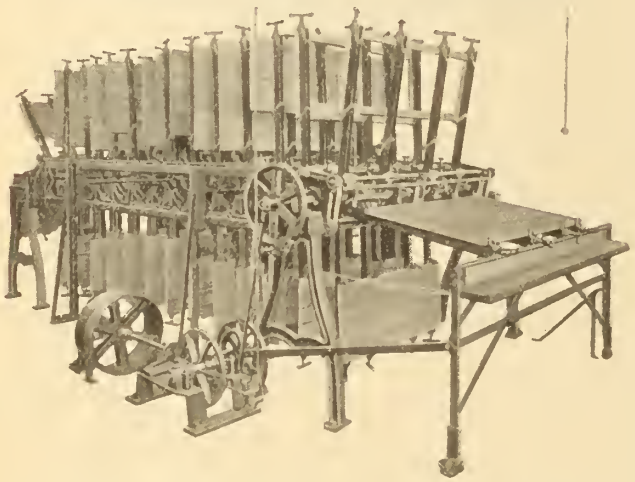


Do You Handle Glued-up Stock?



If you do, here is a machine that will save you 60% of the time and labor required to handle your work with hand clamps. This machine is the Billstrom Automatic Glue Clamp Carrier.

EXAMINE THE ILLUSTRATION

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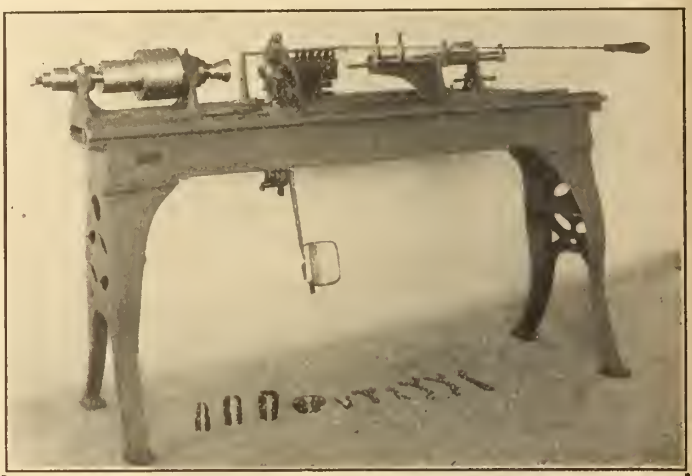
R. S. Pollard, Preston, Ont.



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can be produced most perfectly, economically, and conveniently by the use of the

NEW WAYMOTH WOOD-TURNING LATHE

This machine is most suitable for the production of a wide variety of turnings. In one operation it turns, bores, and cuts off wood turnings in any size up to 34 inches in length.

Let us tell you more about it.

Our lathes are sold in Canada by

A. R. Williams Machinery Co., Toronto, Vancouver and Winnipeg.
General Supply Company of Canada, Ottawa.
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A. D. WAYMOTH & CO., FITCHBURG MASS.

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WHAT IT CONTAINS

Chapter 1—Historical Notes
Chapter 2—Manufacture of Glue
Chapter 3—Testing and Grading
Chapter 4—Methods in the Glue Room
Chapter 5—Glue Room Equipment
Chapter 6—Selection of Glue

Price 50 Cents

Canadian Woodworker

347 Adelaide St. West - Toronto

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ELLIOT WOODWORKER

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ELLIOT WOODWORKER No. 3.

Many Furniture Manufacturers, Cabinet Makers, Pattern Makers, Toy Makers, and Carpenters are finding the ELLIOT WOODWORKER a very economical and useful machine in their plants. It reduces the cost of labor, saves time and material, and is exceptionally useful for a hundred and one jobs. Its light weight and self-contained power makes it the ideal portable machine.

Many of the smaller operations on BETHLEHEM SHELL BOXES are quickly and accurately done, thus saving the expense of using one of your larger machines.

Let us send you full particulars about this great little labor-saver — WRITE TO-DAY.

THE ELLIOT WOODWORKER, LIMITED

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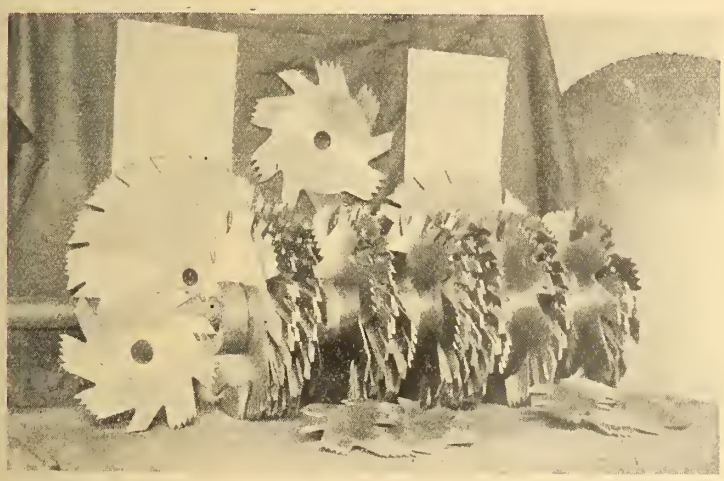
Beaver **Brand**

Reduce the Cost of Making Shell Boxes

by using a

Special "Beaver" Dado



This special "Beaver" Dado was designed to meet the requirements of shell box manufacturers. This particular construction eliminates the trouble previously experienced by many manufacturers in cutting across the grain. It leaves a clean, smooth surface when cutting with or across the grain.

Illustration shows one complete order recently shipped by us to a shell box manufacturer. It consists of—five "Beaver" Dados from 1¼ in. to 2 in. wide; also two special Planer Saws for cutting of box stock; the small groover shown at centre top is to cut slot for wire handle or for string for the cover.

Get our prices on special shell box saws—we can save you money.

Radcliff Saw Manufacturing Company, Limited

TORONTO 550 Dundas Street, **ONTARIO**

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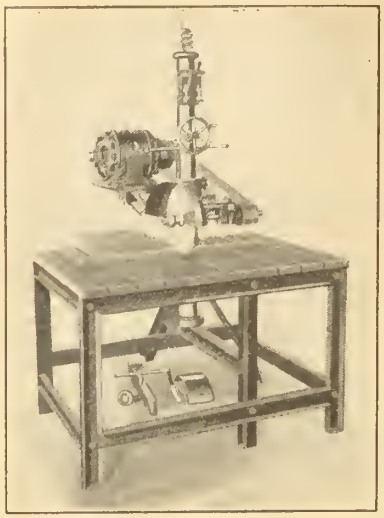

A Profit Maker

This one machine will do the following work: Cutting rafters, studs, braces; Boring for dowelling; Tenoning, Dadoing, Routing, Mitering, Sanding, Ripping, Toolgrinding, etc.

The HUTCHINSON
COMBINATION WOODWORKER

Not simply a saw rig; not a big, complicated machine. Assures maximum service at minimum investment. Always ready for work; easy to set up right at the job. Embodies on one base all the equipment a contractor needs. Sold on its ability to give satisfaction. Ask for catalog and details of our free trial offer.

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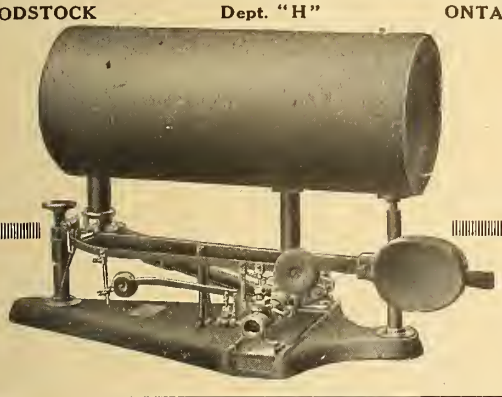

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Common-sense Handrailing, by Fred T. Hodgson. Published by Frederick J. Drake & Company, Chicago. 114 pages, illustrated. Price 50c.

Roof Framing Made Easy, by Owen B. Maginnis. Published by The Industrial Publication Company, New York. 164 pages, illustrated. Price 50c.

"Carpentry," by Ira S. Griffith. Published in 1916 by The Manual Arts Press. 188 pages, illustrated. Price $1 00.

Handrailing Simplified, by An Experienced Architect. Published by William T. Comstock, New York. 52 pages, illustrated. Price 50c.

How to Join Mouldings; or, The Arts of Mitering and Coping, by Owen B. Maginnis. Published by William T. Comstock, New York. 72 pages, illustrated. Price 50c.

Utilization of Wood-Waste (Second Revised Edition), by Ernst Hubbard. Published in 1915 by Scott, Greenwood & Sons. 192 pages, illustrated. Price $1.50.

Woodworker Publishing Company, Limited

345 Adelaide Street West, Toronto, Ontario

The "Canadian Woodworker" Buyers' Directory

An Index to the Best Equipment and Supplies

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DeVilbiss Mfg. Co., Toledo, Ohio.

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Hoyt Metal Co., Toronto.

BALL BEARINGS
Chapman Double Ball Bearing Co., Toronto.

BALUSTER LATHES
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Whitney & Son, Baxter D., Winchendon, Mass.

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Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

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Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

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Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
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Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

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Machinery Co. of America, Grand Rapids, Mich.
Yates Machine Co., P. B., Hamilton, Ont.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Perfection Wood Steaming Retort Company, Parkersburg, W. Va.

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Signal Systems, Limited, Toronto, Ont.

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Fay & Egan Co., J. A., Cincinnati, Ohio.

BENCH PLANERS
Wallace & Co., J. D., Chicago, Ill.

BLOWERS
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BLOW PIPING
Sheldons, Limited, Galt, Ont.

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Garlock-Walker Machinery Co., Toronto, Ont.
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Reynolds Pattern & Machine Co., Moline, Ill.
Yates Machine Co., P. B., Hamilton, Ont.

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Garlock-Walker Machinery Co., Toronto, Ont.
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Preston Woodworking Machinery Company, Preston, Ont.
Reynolds Pattern & Machine Co., Moline, Ill.
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Yates Machine Co., P. B., Hamilton, Ont.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
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Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

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Carborundum Co., Niagara Falls, N.Y.

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Jackson, Cochrane & Company, Kitchener, Ont.

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Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.

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CRATING LUMBER
Read Bros., Limited, Toronto.

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Cowan & Co., Galt, Ont.
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Garlock-Walker Machinery Co., Toronto, Ont.
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Simonds Canada Saw Co., Montreal, Que.
Yates Machine Co., P. B., Hamilton, Ont.

CUTTER HEADS
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Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, Beloit, Wis.
Shimer Cutter Head Co., Galt, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

DOVETAILING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

DOWEL MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

DRY KILNS
Grand Rapids Veneer Works, Grand Rapids, Mich.
National Dry Kiln Co., Indianapolis, Ind.
Sheldons, Limited, Galt, Ont.

DUST COLLECTORS
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DUST SEPARATORS
Sheldons, Limited, Galt, Ont.

EDGERS (Single Saw)
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Garlock-Walker Machinery Co., Toronto, Ont
Simonds Canada Saw Co., Montreal, Que.

EDGERS (Gang)
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Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

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Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

EXHAUST FANS
Garlock-Walker Machinery Co., Toronto, Ont.
Sheldons Limited, Galt, Ont.

FILES
Simonds Canada Saw Co., Montreal, Que.

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Canada Machinery Corporation, Galt, Ont.
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Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

FLUTING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.

FLUTING AND TWIST MACHINE
Preston Woodworking Machinery Company, Preston, Ont.

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Decorators Supply Co., Chicago, Ill.

FURNITURE TRIMMINGS
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Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.

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Ritchey Supply Company, Toronto, Ont.

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Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Yates Machine Co., P. B., Hamilton, Ont.

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Perkins Glue Company, South Bend, Ind.

GLUE CLAMPS
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Neilson & Company, J. L., Winnipeg.

GLUE HEATERS
Fay & Egan Co., J. A., Cincinnati, Ohio
International Electric Co., Indianapolis, Ind.
Jackson, Cochrane & Company, Kitchener, Ont.

GLUE JOINTERS
Canada Machinery Corporation, Galt, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Yates Machine Co., P. B., Hamilton, Ont

GLUE SPREADERS
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Jackson, Cochrane & Company, Kitchener, Ont.

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Garlock-Walker Machinery Co., Toronto, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
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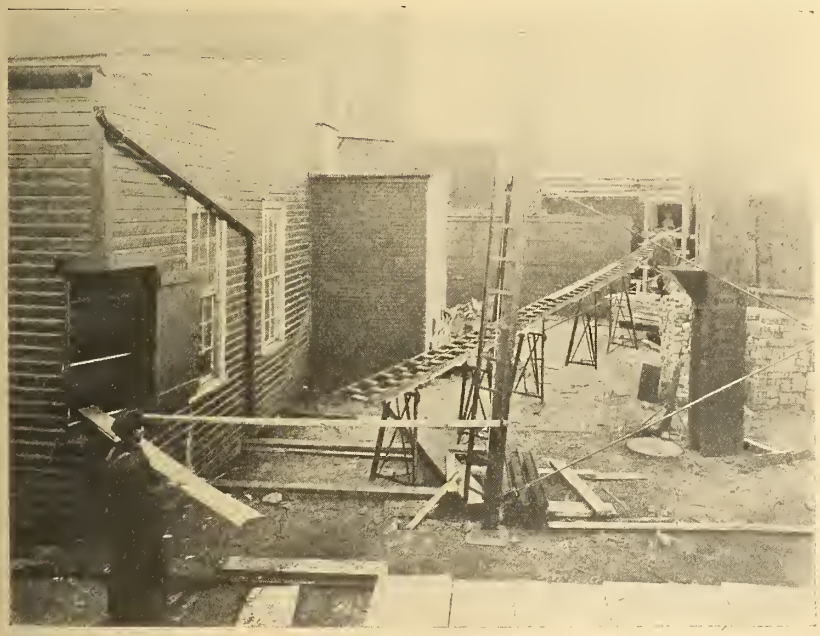

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Hyde Lumber Company, South Bend, Ind.
Penrod, Jurden & McCowen, Memphis, Tenn.
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Fay & Egan Co., J. A., Cincinnati, Ohio.

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Banning, Leland G., Cincinnati, Ohio.
Brown & Company, Geo. C., Memphis, Tenn.
Burns & Knapp Lumber Co., Conneautville, Pa.
Chickasaw Lumber Co., Demopolis, Alabama.
Churchill Milton Lumber Co., Louisville, Ky.
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Korn-Conkling Co., Cincinnati, Ohio.
Martin-Barriss Co., Cleveland, Ohio.
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Pickrel Walnut Co., St. Louis, Mo.
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Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
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Yates Machine Co., P. B., Hamilton, Ont.

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Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

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Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Defiance Machine Works.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.

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Aberdeen Lumber Co., Pittsburg, Pa.
Acme Veneer & Lumber Co., Cincinnati, Ohio.
American Hardwood Lumber Co., St. Louis, Mo.
Anderson-Tully Co., Memphis, Tenn.
Banning, Leland G., Cincinnati, Ohio.
B. C. Lumber Commissioner, Toronto.
Brown & Company, Geo. C., Memphis, Tenn.
Churchill, Milton Lumber Co., Louisville, Ky.
Clark & Son, Edward, Toronto, Ont.
Dermott Land & Lumber Co., Chicago, Ill.
Dominion Mahogany & Veneer Co., Montreal,
Graves, Bigwood Company, Toronto, Ont.
Hartzell, Geo. W., Piqua, Ohio.
Huddleston, Marsh Mahogany Co., New York.
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Paepcke Leicht Lumber Company, Chicago, Ill.
Pickrel Walnut Co., St. Louis, Mo.
Probst Lumber Co., Cincinnati, Ohio.
Read Bros., Limited, Toronto.
Stimson & Co., J. V., Owensboro, Ky.

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Yates Machine Co., P. B., Hamilton, Ont.

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Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

MITRE SAWS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Simonds Canada Saw Co., Montreal, P.Q.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Reynolds Pattern & Machine Co., Moline, Ill.

PANELS
Waetjen & Co., George L., Milwaukee, Wis.

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Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PLANERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Wallace & Company, Chicago, Ill.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PLANING MILL MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PRESSES (Veneer)
Canada Machinery Corporation, Galt, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Perrin & Co., Wm. R., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.

PULLEYS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Machinery Co. of America, Grand Rapids, Mich.

RED GUM LUMBER
Gum Lumber Manufacturers' Association.

RECORDERS (TIME)
International Time Recording Co., Toronto, Ont.
Signal Systems, Limited, Toronto, Ont.

RESAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

RIM AND FELLOE MACHINERY
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.

RIP SAWING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Sinker-Davis Company, Indianapolis, Ind.
Yates Machine Co., P. B., Hamilton, Ont.

SANDERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Nash, J. M., Milwaukee, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SASH, DOOR & BLIND MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SAWS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Radcliff Saw Mfg. Company, Toronto, Ont.
Shurly-Dietrich, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Smith Co., Ltd., R. H., St. Catharines, Ont.

SAW GUMMERS, ALOXITE
The Carborundum Co., Niagara Falls, N.Y.

SAW SWAGES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Machinery Co. of America, Grand Rapids, Mich.
Simonds Canada Saw Co., Montreal, Que.

SAW TABLES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SCRAPING MACHINES
Canada Machinery Corporation, Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass

SCREW DRIVING MACHINERY
Canada Machinery Corporation, Galt, Ont.
Reynolds Pattern & Machine Works, Moline, Ill.

SCROLL SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

SECOND-HAND MACHINERY
Cowan & Co., Galt, Ont.
Petrie, H. W.
Wayne Machinery Co., Fort Wayne, Ind.

SHAPERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Whitney & Sons, Baxter D., Winchendon, Mass
Yates Machine Co., P. B., Hamilton, Ont.

SHARPENING TOOLS
The Carborundum Co., Niagara Falls, N.Y.

SHAVING COLLECTORS
Sheldons Limited, Galt, Ont.

SHOOK BUNDLER
Neilson & Company, J. L. Winnipeg, Man.

SPRINGS FOR UPHOLSTERY
Foster Bros. Mfg. Co., Utica, N.Y.

STAINS
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.
Schmidt, Walter K., Grand Rapids, Mich.

STEAM APPLIANCES
Darling Bros., Montreal.

SINGLE SPINDLE BOXING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

STAVE SAWING MACHINE
Whitney & Sons, Baxter D., Winchendon, Mass

STEAM TRAPS
Canadian Morehead Mfg. Co., Woodstock, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

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Peter Hay knives are made of special quality steel tempered and toughened to take and hold a keen cutting edge. Hay knives are made for all purposes.

Have you our Catalogue?

Made in Canada

The Peter Hay Knife Co., Limited

GALT, ONTARIO

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For Veneer and Veneer Drying

Made in Canada

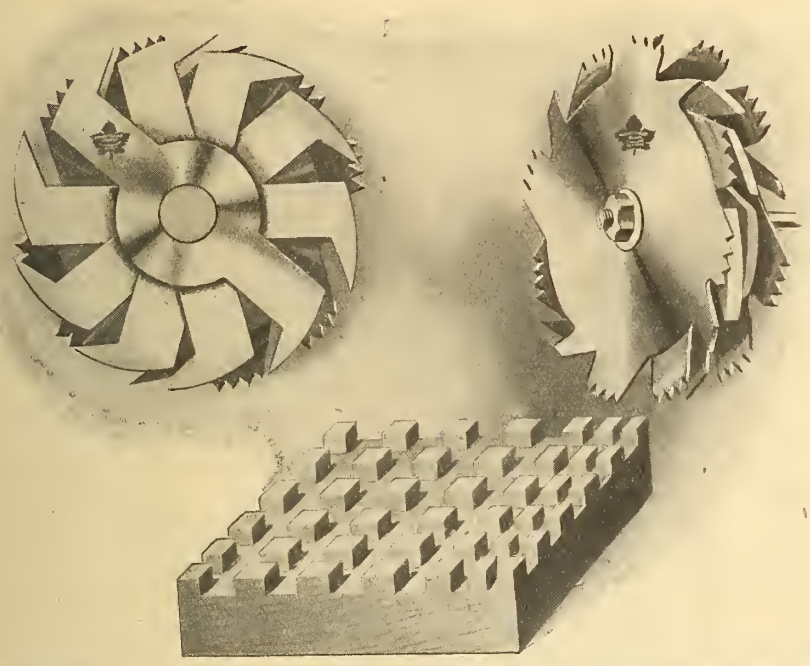
William R. Perrin

Limited

Toronto

It Pays to Use

"Maple Leaf" Saws



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Bands,

all kinds of

Special Circular Saws

for Special work,

Cross Cut Saws,
Gang Saws,
Grooving Saws,
Chamfering Saws,
Concave Saws,
etc., etc.

EVERY SAW GUARANTEED.

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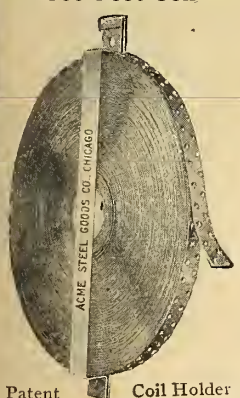
Vancouver, B.C. **Hull, Quebec**

"DOT EMBOSSED" 300 Foot Coil



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SMOOTH EDGES—CONTINUOUS LENGTHS
COIL HOLDERS SUPPLIED
LACQUERED—GALVANIZED——BRIGHT

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Corrugated Joint Fasteners

In bulk in Barrels and Boxes.

In coils for Automatic Driving Machines.

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STEEL SHELL BOX BANDS
Acme Steel Goods Co. of Canada, Ltd.

SURFACERS
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Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

SWING SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

TABLE LEG LATHES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Mattison Machine Works, C., Beloit, Wis.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

TABLE SLIDES
Walter & Co., B., Wabash, Ind.

TENONING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

TRANSMISSION MACHINERY
Dodge Mfg. Co., Ltd., Toronto, Ont.

TELEPHONES—PRIVATE SYSTEMS
Signal Systems, Limited, Toronto, Ont.

TRIMMERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

TRUCKS
Sheldons Limited, Galt, Ont.
National Dry Kiln Co., Indianapolis, Ind.

TURNING MACHINES
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Mattison Machine Works, C., Beloit, Wis.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

UNDER-CUT SELF-FEEDING FACE PLANER
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

VARNISHES
Ault & Wiborg Company, Toronto, Ont.

VARNISH SPRAYERS
DeVilbiss Mfg. Co., Toledo, Ohio.

VENEERS
Acme Veneer & Lumber Co., Cincinnati, Ohio.
Barnaby, Chas. A., Greencastle, Ind.
Central Veneer Co., Huntington, W. Virginia.
Clark Veneer Co., Walter, Grand Rapids, Mich.
Dominion Mahogany & Veneer Company, Montreal, Que.
Hartzell, Geo. W., Piqua, Ohio.
Haughton Veneer Company, Chicago, Ill.
Hoffman Bros. Company, Fort Wayne, Ind.
Geo. Kersley, Montreal, Que.
Nartzik, J. J., Chicago, Ill.
Ohio Veneer Company, Cincinnati, Ohio.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Roberts Veneer Co., New Albany, Ind.
Toronto Veneer Company, Toronto, Ont.
Waetjen & Co., George L., Milwaukee, Wis.

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Ideal Coated Paper Co., Brookfield, Mass.

VENTILATING APPARATUS
Sheldons Limited, Galt, Ont.

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Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Perrin & Company, Wm. R., Toronto, Ont.

VISES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Company, Montreal, Que.

WAGON AND CARRIAGE MACHINERY
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

WATCHMAN'S CLOCKS
Signal Systems, Limited, Toronto, Ont.

WOOD FINISHES
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

WOOD PULLEYS
Dodge Mfg. Co., Ltd., Toronto, Ont.

WOOD TURNING MACHINERY
Canada Machinery Corporation, Galt, Ont.
Defiance Machine Works, Defiance, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Waymoth & Co., A. D., Fitchburg, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

WORK BENCHES
Fay & Egan Co., J. A., Cincinnati, Ohio.

WOODWORKING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Elliot Woodworker Limited, Toronto, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Hutchinson Woodworker, Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Reynolds Pattern & Machine Works, Moline, Ill.

WHEELS, Grinding, Carborundum and Aloxite
The Carborundum Co., Niagara Falls, N.Y.

You Have Paid for an Installation of

Chapman Double Ball Bearings

in Your Factory over and over again, BUT—

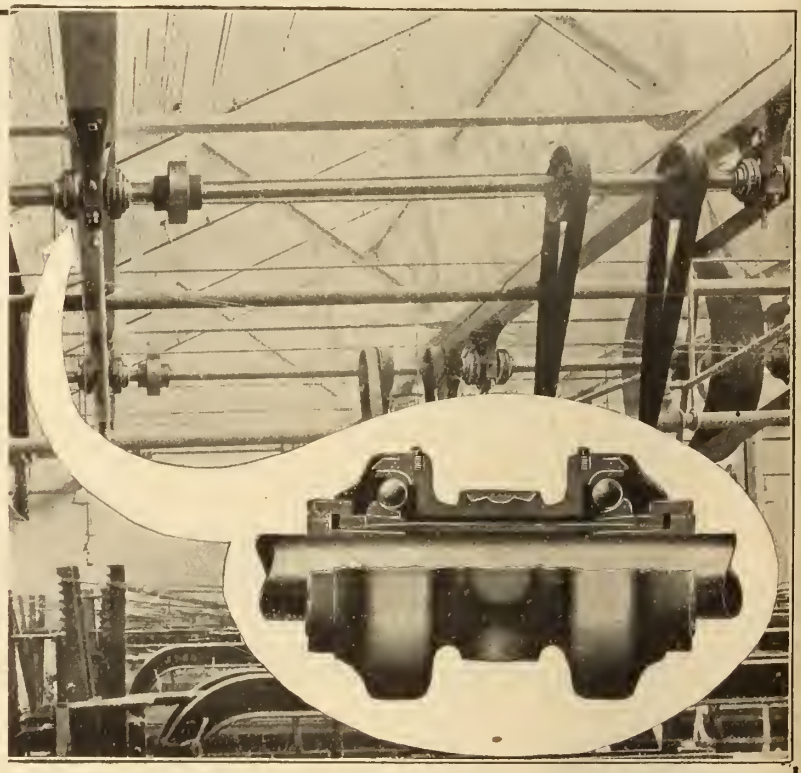
HAVE YOU GOT THEM ?

Ordinary line shafting wastes from 15 per cent. to 60 per cent. of power.

Line shafting equipped with Chapman Double Ball Bearings will eliminate about 75 per cent. of the friction, thus averaging a total saving of from 15 per cent. to 30 per cent.

Chapman Double Ball Bearings fit any adjustable hanger and require oiling and attention only once a year. No extra equipment required to install.

Write to-day for full particulars.



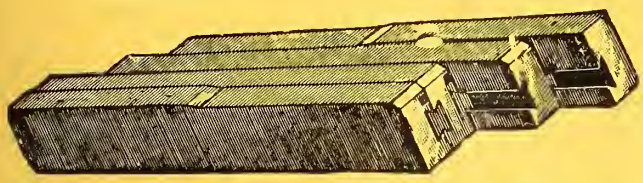
The Chapman Double Ball Bearing Co. of Canada, Limited

Toronto 339-351 Sorauren Ave. Ontario

American Branch: The Transmission Ball Bearing Co., Inc., 32 Wells St., Buffalo, N.Y.

Making TABLE-SLIDES is a Specialty Business

For more than TWENTY-FIVE YEARS we have made TABLE SLIDES exclusively. Our Factory is equipped with Special Machinery which enables us to make SLIDES,—BETTER and CHEAPER than the furniture manufacturer.



Canadian Table makers are rapidly adopting WABASH SLIDES

Because { They ELIMINATE SLIDE TROUBLES / Are CHEAPER and BETTER

Reduced Costs / **Increased Out-put** { BY USING **WABASH SLIDES**

MADE BY

B. Walter & Company

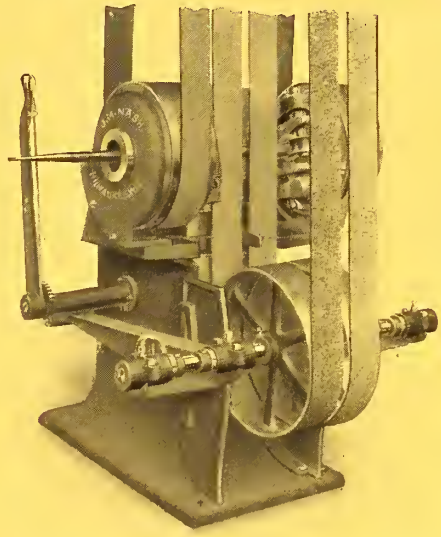
Wabash, Ind.

The Largest EXCLUSIVE TABLE-SLIDE Manufacturers in America

ESTABLISHED-1887

YOU CAN

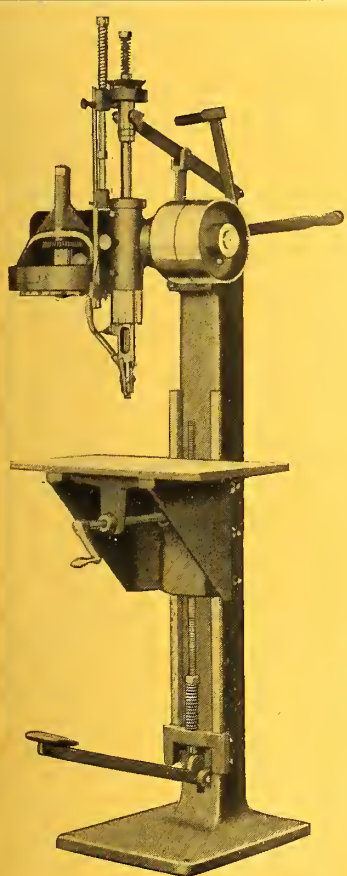
Cut Your Sanding Cost



on your round work if you have a NASH SANDER.

Many are saving $3.00 to $4.00 a day by its use. Why not you?

J. M. NASH, MILWAUKEE, Wis.



No. 2 Standard Type Automatic Screw-driving Machine.

The Only Way to Drive Screws

There is a stage-coach method and a modern method of doing everything. When it comes to driving screws the only modern way is with an Automatic Screw Driving Machine, which means greater and better production and greater profit.

The Reynolds Automatic Screw-Driving Machine

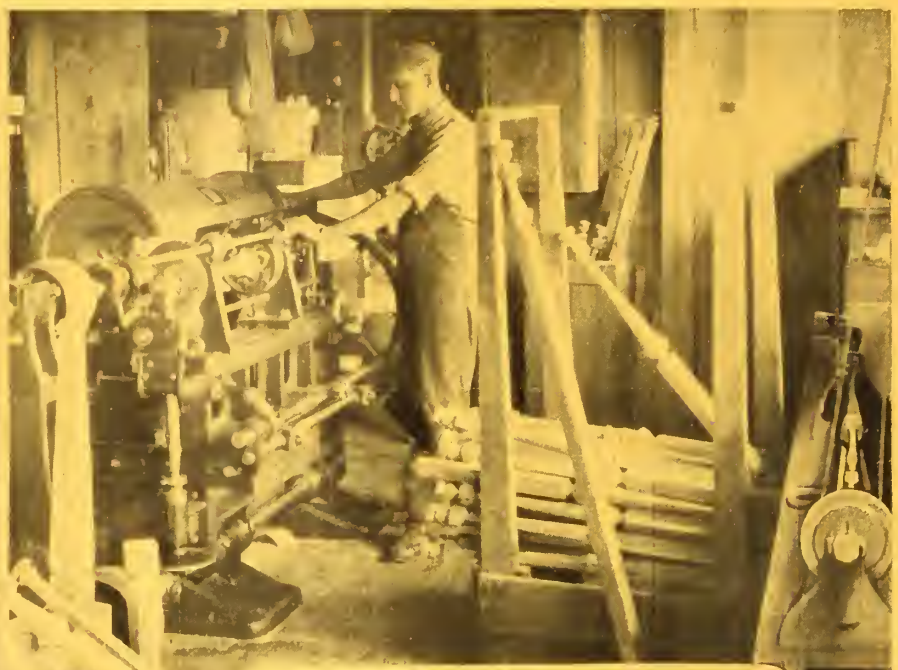
is guaranteed to produce results. It is no experiment. The No. 2 Standard Type, shown herewith, is particularly suited for placing the screws in the straps of shrapnel boxes. It may be fitted to drive, without change or adjustment, any three consecutive sizes flat or round head, or two sizes filister head, No. 6 to 14 inclusive, wood or machine screws, or three sizes flat or round head, or two sizes filister head machine screws up to No. 20. All the above up to 1½ inches long if smaller than No. 10, or up to 1¾ inches long, No. 10 or larger. Fitted with boring attachment if desired.

Many Machines in Use in Canada.

Ask for our Catalogue.

REYNOLDS PATTERN & MACHINE CO.

101 and 103 Third Ave., Moline, Ill., U.S.A.



The Passing of the Hand-Turner

Time was when the Hand Turner was supreme in his field.

It was only by hand turning that the better class of designs could be produced.

The machine methods that existed in the old days were very limited in the range of designs handled, and practical only where very large quantities of a single pattern were put through

As a result, among the medium grade furniture trade in particular, turned styles were shunned. Hand turning was too expensive, machine turning was impractical.

But what a different condition exists today. In practically all grades of furniture, turned styles are featured—more turned work hundreds of times over is used than ever before.

Why? Simply because necessity has caused the development of a machine turning method that is practical.

As to the matter of designs it has not only caught up with the possibilities of hand turning, but passed so far beyond that many of today's most popular patterns could not even be attempted on a hand lathe, even if cost was not a consideration.

MATTISON
Automatic
The Standard Shaping Lathe
OVER 2000 IN USE

And it is practically because its simplicity enables any ordinary mechanic to operate it. There is no limit to the variety of patterns handled, and it is not limited to round shapes—but takes care of squares, octagons, ovals, etc., just as easy.

Small quantities may be run through economically.

It supplies an all-round machine turning method and has become so standard in the majority of our furniture factories that they would as soon go back to hand planing as hand turning.

C. MATTISON MACHINE WORKS

883 Fifth Street - - - BELOIT, WISCONSIN

Volume Seventeen TORONTO, MAY, 1917 Number Five

CANADIAN WOODWORKER and Furniture Manufacturer

Registered Trade Mark of

CANADA MACHINERY CORPORATION
LIMITED

C.M.C.

Woodworking Machinery

Canadian made Machinery of Highest Standard
of Workmanship and Design

SOLD DIRECT
and by Leading Machinery Dealers

CANADA MACHINERY CORPORATION
LIMITED

GALT - - ONT.

TORONTO SHOWROOMS—BROCK AVENUE SUBWAY

Steam Power Production and Transmission

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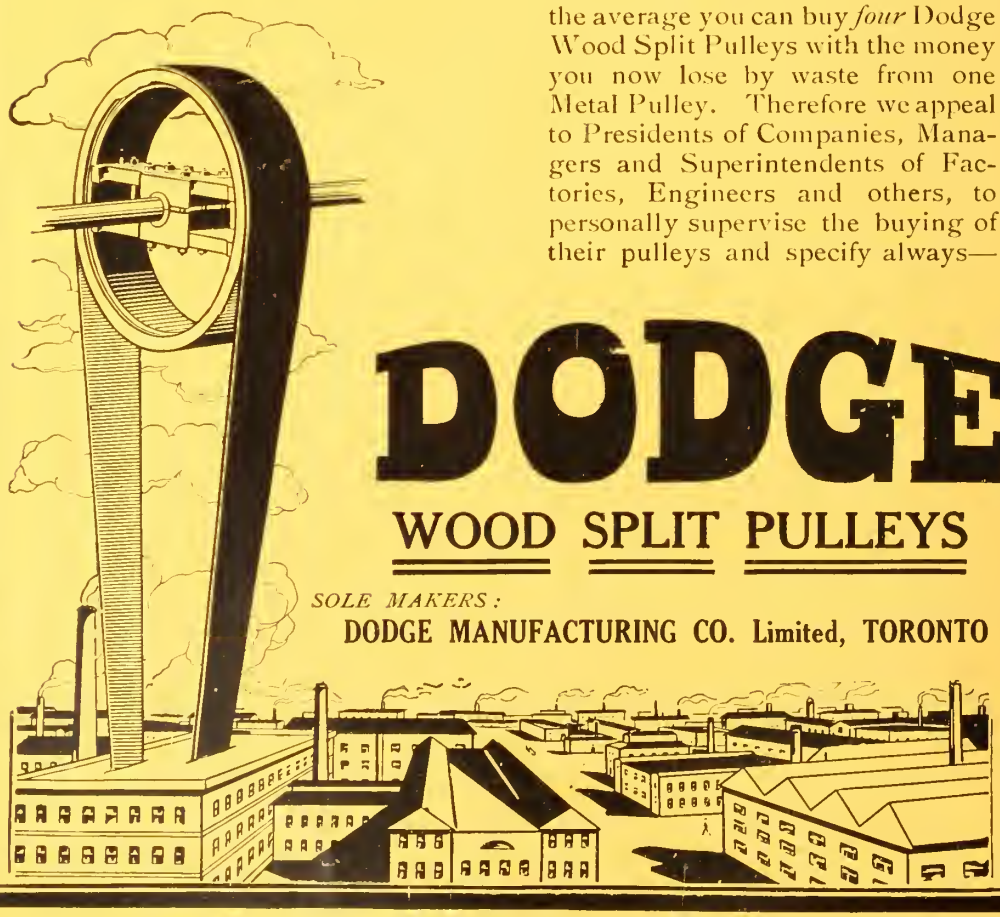
RELENTLESS and ever present in Factory operation is the spectre of Overhead Charges.

Its ravages among the profits of your business must be constantly checked. One of its most active lieutenants is *Power Wastage* —caused by belt slippage over metal pulleys. Many thousands of dollars are wasted yearly in Canadian Factories and workshops where Wood Pulleys would save 50% of the waste.



Actual scientific tests show that on the average you can buy *four* Dodge Wood Split Pulleys with the money you now lose by waste from one Metal Pulley. Therefore we appeal to Presidents of Companies, Managers and Superintendents of Factories, Engineers and others, to personally supervise the buying of their pulleys and specify always—

DODGE

WOOD SPLIT PULLEYS

SOLE MAKERS:
DODGE MANUFACTURING CO. Limited, TORONTO

5

GARLOCK-WALKER MACHINERY CO. LIMITED

32 FRONT ST. WEST, TORONTO TELEPHONE MAIN 5346

Labor-Saving and Time-Saving Machinery

In all woodworking plants, under present conditions, up-to-the-minute LABOR-SAVING and TIME-SAVING machinery is an absolute necessity from a profitable business standpoint.

In no other way can the manufacturer so readily reduce the cost of his product without detracting from its quality.

We will on request, without obligation on your part, send cuts and descriptions of the latest improved machines for any operation. They give information that will be valuable for your files.

A List of Our Leading Woodworking Machines:

Band Resaws.
Band Rip Saws.
Band Edging and Ripping Machines.
Band Scroll Saws.
Bevel Band Saws.
Box Board Matchers.
Buzz Planers.
Box Machinery.
Boring Machines, Horizontal or Vertical, Single or Multiple Spindle.
Carving Machines.
Circular Saws, Rip and Cross Cut.
Combination Saws.
Cut-off Saws.
Dado or Grooving Machines.
Dovetailers.
Drum Sanders.
Endless Bed Sanders.
Furniture Graining Machines.
Filing and Setting Machines.
Gang Edgers and Rippers.
Glue Jointers.
Automatic Gang Rip Saws.
Hardwood Flooring Outfits.
Jointers, Power and Hand Feed.
Knife Grinders.
Lathes — Back Knife, Manual Training, Pattern Makers'.
Lath Mills and Bolters.
Lumber Registers.
Mitre Machines.
Mortisers — Hollow Chisel, Vertical or Horizontal.
Moulders—Inside or Outside.
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Planers—Endless Bed.
Planers and Matchers, light
Planers and Matchers, Fast Feed.
Rod and Dowel Machines.
Sanders, Drum, Disc, etc.
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Screw Driving Machines.
Surfacers, Single or Double.
Swing Saws.
Timber Sizers.
Tenoners, Single or Double End.
Veneer Presses.
Variety Lathes.
Veneer Jointers.
Universal Saw Benches.
Wood Turning Lathes.

"EVERYTHING IN WOODWORKING MACHINERY."

Garlock-Walker Machinery Company, Limited

32 Front Street West, Toronto

METAL and WOODWORKING MACHINERY of all Kinds

THE COMPLETE LINE

The adoption of correct **PERIOD TRIMMINGS** and **ACME CASTERS** assures satisfied customers to the furniture manufacturer.

The traditions of the various periods are faithfully portrayed in the designs and finish of our **TRIMMINGS.**

The experience of many years has taught us how to make **CASTERS** that are strong, durable and altogether worthy of your product.

Our line also comprises **CABINET HARDWARE** of every description including fittings for phonograph cabinets, refrigerators, & etc., etc.

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Saw and Knife Fitting Machinery and Tools

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Filers
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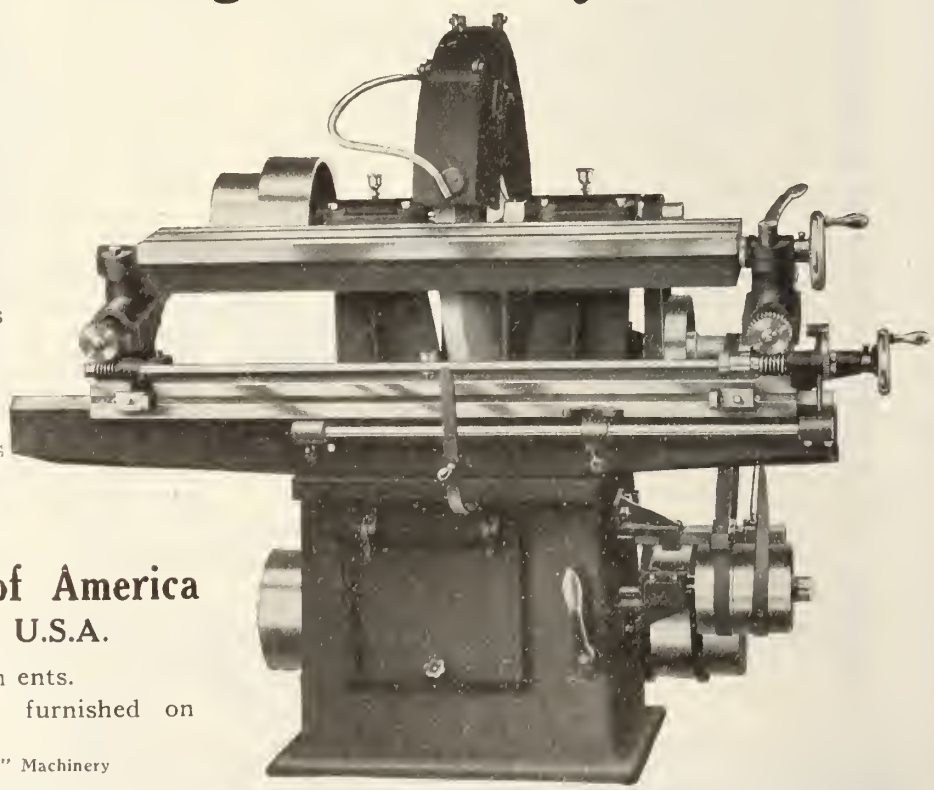
Forges
Gummers
Hammers
Lap Cutters
Lap Grinders
Leveling Blocks
Pulleys
Retoothers
Setters
Shapers
Sharpeners
Solder
Straight Edges
Stretchers
Swages
Tension Gauges
Tools
Bandwheel, Cutter and Tool Grinders
Knife Grinders and Balances



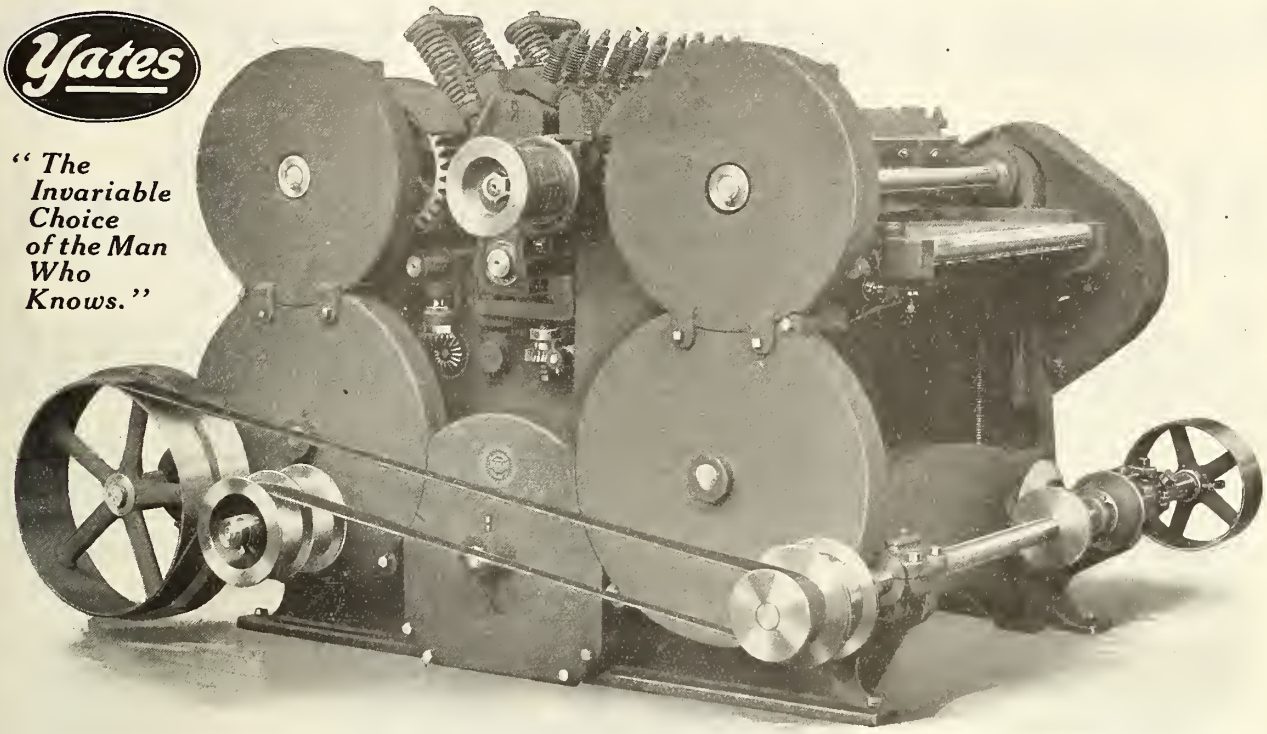
Machinery Company of America

Grand Rapids, Mich., U.S.A.

Describe Your Requirem ents.
Catalog with special information furnished on request.
"Covell" – "Hanchet" – "B T & B" Machinery

Yates

"The Invariable Choice of the Man Who Knows."



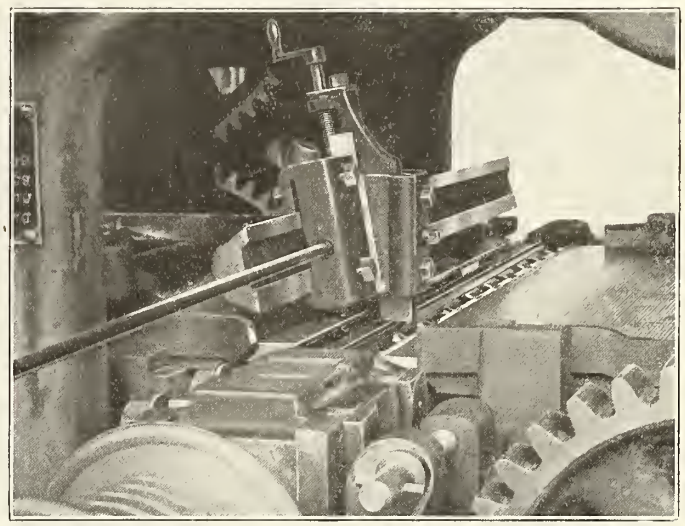
The Value of a Surfacer—

The value of a surfacer is determined by its performance. If it has a record of many satisfactory installations, that is proof that the surfacer is good. If it has become standardized—no more changes have been found needful—that is proof that the surfacer is no longer an experiment, but is a reliable investment.

The No. 177 is the surfacer that meets these conditions. Hundreds of satisfied owners are found all over the United States and Canada. They're all "boosters" for the No. 177. In addition, it's a "standard" machine. Not a change has been found necessary for several years. It can be relied upon for satisfactory performance under all proper surfacing conditions. Made either belt or direct motor drive.

Yates No. 177

is the best surfacer to install for heavy work. Constant additions to the number of its satisfied owners is the evidence. Begin a satisfactory solution for your surfacer problem at once. Send for our free circular No. 177.



The above cut shows the bar for the grinding and jointing devices in position to work on the knives of the lower cutter head, with the jointing device in correct position. An average of 20 minutes or less per day keeps the knives in perfect shape for the finest surfacing.

P. B. Yates Machine Company Ltd.

HAMILTON, ONT. CANADA

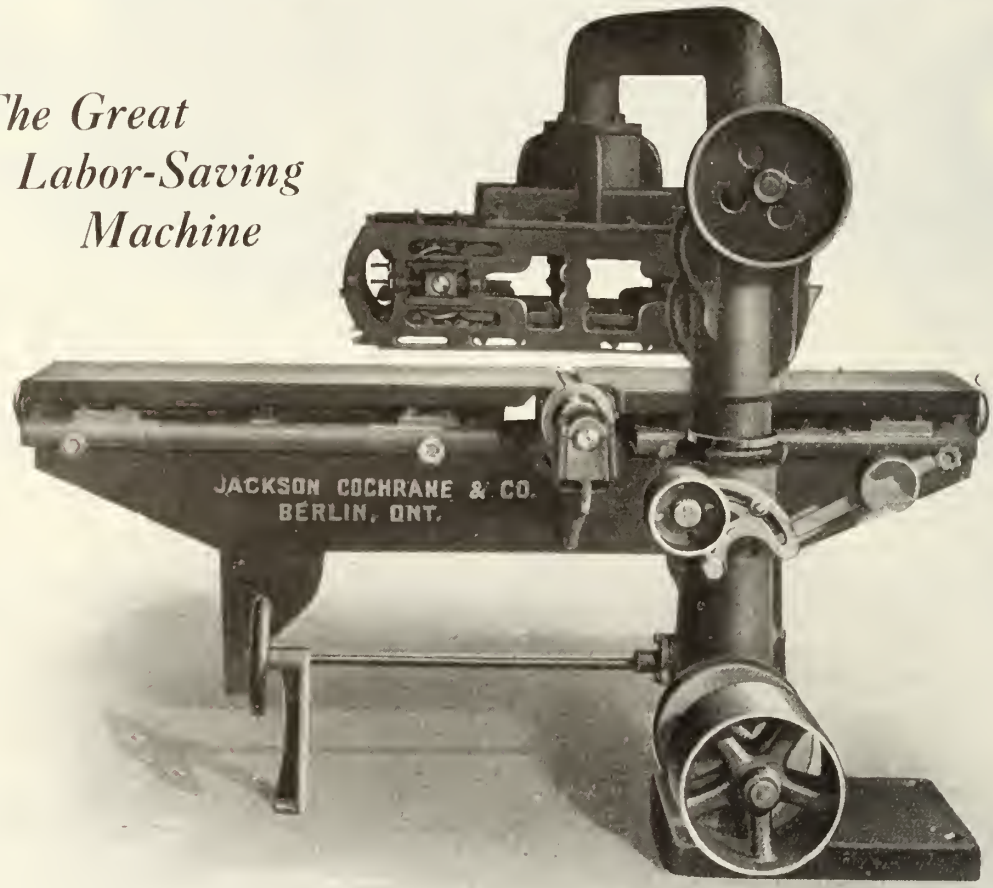
U. S. Plant: BELOIT, WISCONSIN

Increase Your Capacity Four Times

by installing the

Herzog Swing-Out Jointer Attachment

The Great Labor-Saving Machine



Our No. 38 Self-Feed Jointer Attachment, Illustrated above, is especially desirable for factories that have but one or two jointers where it is desired to use it for squaring or edging, as the attachment can be quickly swung from the jointer. It does more and better work than four men can do with hand-jointing, can be operated by two boys, will handle stock from one inch wide to the full width of the jointer and produce perfect work. Stock can vary one-half inch in thickness without making any adjustment.

Ask for Bulletin

Jackson, Cochrane & Co., Kitchener, Ont.

The "Shimer Limited" Expansion Head

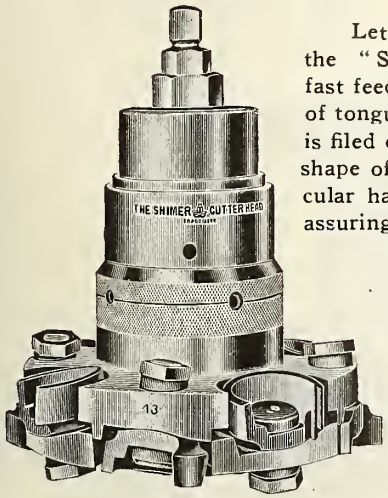


Fig. 627

Let us draw your attention to the advantages of using the "SHIMER CUTTER HEAD" for general Mill and fast feed Planer work. The Cutter is turned to cut the shape of tongue and groove desired, so that to sharpen the cutter it is filed or ground on its face, guaranteeing the user the same shape of cut during the life of the cutter. The bit being circular has from 3½ in. to 5 in. cutting length to the cutter, assuring long wearing life to the cutters.

Note that the cutter, being fastened to a concave seat on a compound angle, assures the user of the proper clearance of cutters, consequently they never burn.

These heads are fitted with or without the Self-Centering Sleeve, and made Expansion or Solid, to suit the customer's wishes.

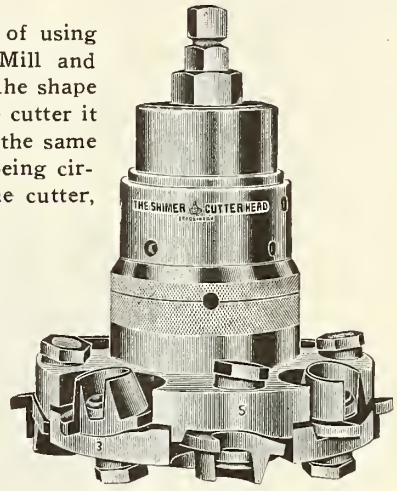


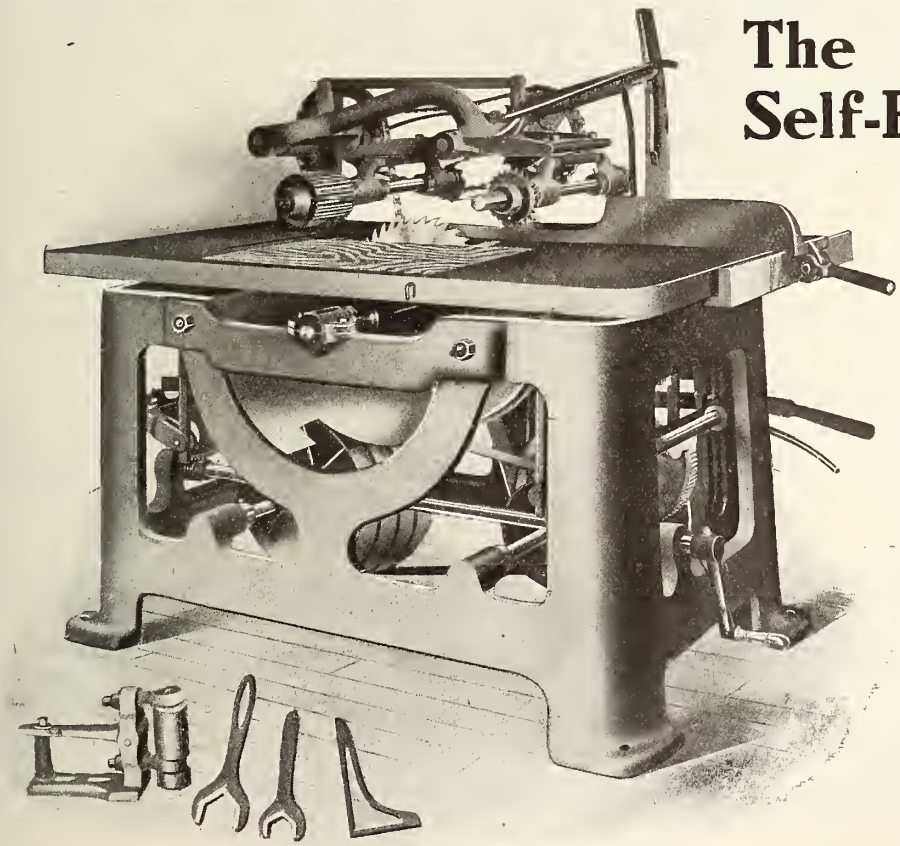
Fig. 268

Shimer Heads have been in use for sixty years, and their reliability and reputation have spoken for them in the past. Let us know your wants and we will guarantee their reliability at the present.

SHIMER CUTTER HEAD CO. OF CANADA, LIMITED

Successors to Samuel J. Shimer & Sons, Inc.

GALT, ONTARIO



The New Hoosier Self-Feed Rip Saw

This is our Standard or No. 1 Hoosier Self Feed Rip Saw, which is now built with hinged upper feed works so that they can be quickly and easily raised up out of the way and the machine used for hand-feed work.

The machine is capable of ripping as thick as 6 in. and as wide as 20 in., and can be used for single, gang, or bevel ripping, the feed being strong enough to pull six saws through 1 in. stock. Four rates of feed are provided from 35 to 150 ft. per minute.

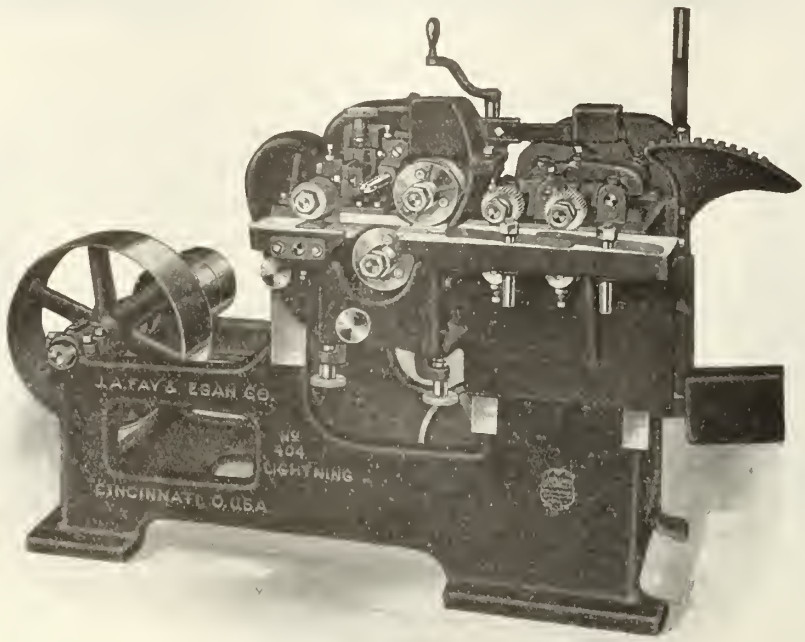
To take care of special ripping problems we build Hoosier Rip Saws in seven other styles.

For further information address

The—

Sinker-Davis Company

INDIANAPOLIS, IND.



A NEW MACHINE FOR MAKING PENCILS, SKEWERS, DOWELS, AND ESPECIALLY *FLAG STICKS.*

PENCILS — Stock of foreign made pencils, imported before the war, are exhausted—a new supply must be manufactured. This machine makes the wood part, round, hexaround or hexagon.

SKEWERS — Always in big demand—a good staple product—made on a No. 404.

DOWELS—More used now than ever—big demand for use in wood ship and small boat construction — No. 404 makes them.

FLAGSTICKS — Right now stocks are completely exhausted—big demand unsatisfied—market will continue strong—No. 404 the only real flag-sticker made.

This is a new big production machine — Get one now—It will pay you well—Ask for Bulletin E-15.

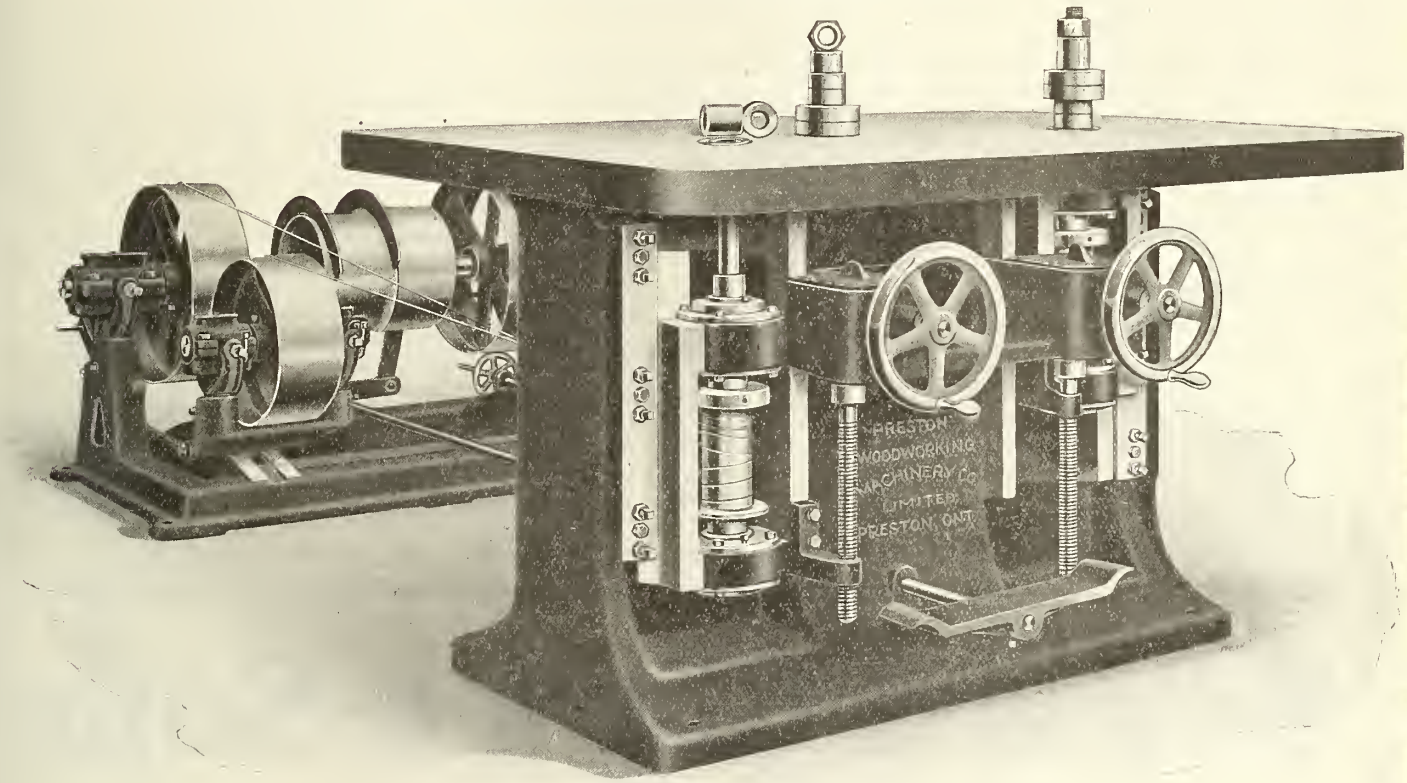
J. A. FAY & EGAN CO.

153-173 W. Front Street CINCINNATI, OHIO

"Treat your machine as a living friend."

Don't Waste Time

for which you are paying big money by having a Machine in your plant which is not giving you a maximum of production every day



No. 162 High-Speed Ball-Bearing Shaper

SEE THIS MACHINE!

It's built absolutely on honor, and will turn out 100% MORE WORK than the ordinary shaper which you are now using. That's our claim; twice the amount of work and much easier on the operator. Is it worth your while to cut your shaper cost in two? If so, drop us a line for more particulars.

THE CHEVROLET MOTOR CO. ARE USING 6 OF THESE MACHINES IN THEIR PLANT AT OSHAWA

DIMENSIONS, WEIGHTS and SPEEDS

Floor Space, 120 in. x 58 in. Net Weight, 2650 lbs. Shipping Weight, 2750 lbs. Tight and Loose Pulleys on Countershaft, 10 in. x 6 in. Driving Pulleys on Countershaft, 18 in. x 5 in. Idler Pulleys, 14 in. x 5 in. R.P.M. Countershaft, 1200. Pulley on Spindle, 3⅛ in. x 6 in. R.P.M. Spindle, 7000. Diameter Spindle, 2 3/16 in. Spindle Centres, 28 in. Table, 58 in. x 41 in. Diameter Spindle Top, 1¼ in. Horse Power Required, 3. Front Projection, 17 in. Height, 35 in.

"The Machine you want in your plant is not the cheapest machine to buy but the machine that will save you the most money to use."

The Preston Woodworking Machinery Co. Limited, Preston, Ont.

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Edward Clark & Sons

Toronto

CANADIAN HARDWOODS—winter cut **Birch, Basswood, Maple**

Ontario and Quebec Stocks, East or West, rail or water shipment direct from mill to factory.

Let us quote you on bored diaphragms for Bethlehem boxes, interlocking style, guaranteed to meet Imperial Munition Board requirements.

We Commend to Your Notice:

Our lumber is **reliable**, our grades **uniform**, our shipments **prompt**, and receive **personal supervision**; our prices **consistent**. We have had **long experience**. We desire **to serve**.

Insure Long Life to Your Product By Maintaining and Applying Glue at the Correct Temperature

To insure satisfaction to your customers, and prevent glued joints from coming apart "out on the job" it is necessary that animal glue be kept and applied at a temperature of 145 to 150 degrees Fhr.

"INTERNATIONAL" ELECTRIC GLUE HEATERS maintain the correct working temperature at all times and under all conditions. **CAN YOU** afford to do without "INTERNATIONAL INSURANCE" on your product? Obtainable at no extra cost.

You insure your plant and equipment. What about your product and the good-will of your customers?

The International 1-qt. heater operates on **less than one cent per day** for current. Soon saves its initial cost in glue saved, more economical operation and time conserved. Absolutely safe, clean and economical. No fire risk.

Fireless cooker principle of construction prevents radiation. No skin, scum or dirt on glue. No hot steam pipes during summer months. No leaky valves.

Constructed entirely of heavy spun copper. No seams. No water bath. No burnouts. No burnt glue. Three heats—high, medium and low. Provides rapid melting and uniform temperature control for all working conditions. Portable—fits any lamp socket.

Operates on less current than any other electric glue heater.

Write for illustrated folder, "Correct Temperatures in the Glue Room"—information of interest to every practical glue man. Get our quotations on "International" Electric Glue Heaters—sizes 1 pint to 50 gallons.

INTERNATIONAL ELECTRIC COMPANY
MANUFACTURERS
ELECTRICAL HEATING APPLIANCES
INDIANAPOLIS, U.S.A.

5 Gallon 4 Quart 2 Quart 1 Quart 1 Pint

Saint Francis Basin Band Sawed Oak

Soft Textured, Evenly Colored, Red and White

GET THE THRIFT OF LUMBER BUYING

Stock put in transit May and June will relieve you of July, August and September worries.

We are Headquarters for

St. Francis Basin Kraetzer Cured Gum

Send us a list of your requirements. — Delivered Prices will be cheerfully quoted.

GEO. C. BROWN & CO.

Mill—PROCTOR, Ark. **Main Office—MEMPHIS, Tenn.**

We specialize in Tennessee Aromatic Red Cedar

RED GUM

"AMERICA'S FINEST CABINET WOOD"

The really successful merchant, it matters not in what line, is he who takes the trouble to ascertain

WHAT THE PUBLIC WANTS

This is especially true in its application to the furniture manufacturer and his retailer. He *has to* study his public—or he soon will have no public.

That portion of his public which is influenced by the principles of good taste wants RED GUM furniture—Why? Because the color, grain and soft, velvety quality of this, the finest of America's cabinet woods, when handled by a master cabinet-maker, results in a thoroughly charming piece of furniture—the kind that people of nice discrimination like to have around—and want strongly enough to *ask for*. Then can YOU supply it?

Makers and dealers desiring to see samples of RED GUM, both rough and finished, are invited to correspond with us at once.

GUM LUMBER MANUFACTURERS' ASSOCIATION

1314 Bank of Commerce Bldg., Memphis, Tennessee.

Dry Spruce and Birch

Good Stocks, Prompt Shipments, Satisfaction

C. A. SPENCER, Limited

Wholesale Dealers in Rough and Dressed Lumber

Offices—500 McGill Building
MONTREAL - - Quebec

Churchill Milton Lumber Co.

Louisville, Ky.

We carry at
NEW ALBANY, IND.

Genuine Indiana Plain and Quartered Oak, Poplar

At GLENDORA, MISS.

Cypress, Gum, Cottonwood, Oak

SEND US YOUR INQUIRIES

We have dry stock on hand and can make quick shipment

American Hardwood Lumber Co.

St. Louis, Mo.

Large stock of—

Dry Ash, Quartered Oak Plain Oak and Gum

Shipments from — NASHVILLE, Tenn., NEW ORLEANS, La., and BENTON, Ark.

TWENTY YEARS OF SQUARE DEALING IN

HARDWOODS

Manufacturers

Mississippi Mills

Plain Oak — Red Gum
Quartered Oak — Sap Gum
Cypress — Cottonwood

Missouri Mills

Soft Maple — Soft Elm
Tupelo — Oak Dimension

West Virginia Mills

Plain Oak — Poplar
Chestnut — Oak Dimension

The
KORN-CONKLING CO.
Head Offices—CINCINNATI, OHIO

BLACK WALNUT

Large Stock 1 to 3 inches thick ready for immediate shipment

also

Well Assorted Stocks of

West Virginia & Kentucky

OAK

Ash, Maple, Hickory, Chestnut, Basswood and Poplar

Prices and stock list on request

Burns & Knapp

Lumber Company

CONNEAUTVILLE, PA.

Dermott Offers You, Mr. Buyer:

QUARTERED WHITE OAK

3 cars 1 in. firsts and seconds.
1 car 1¼ in. firsts and seconds.
2 cars 1½ in. firsts and seconds.
1 car 2 in. firsts and seconds.
5 cars 1 in. No. 1 common.
2 cars 1¼ in. No. 1 common
1 car 1½ in. No. 1 common.
1 car 2 in. No. 1 common.

PLAIN WHITE OAK

10 cars 1 in. firsts and seconds.
4 cars 1¼ in. firsts and seconds.
2 cars 1½ in. firsts and seconds.
2 cars 1¾ in. firsts and seconds.
5 cars 2 in. firsts and seconds.
½ car 2½ in. firsts and seconds.
½ car 3 in. firsts and seconds.
5 cars 1 in. No. 1 common.
2 cars 1¼ in. No. 1 common.
1 car 1½ in. No. 1 common.
3 cars 2 in. No. 1 common.

PLAIN RED OAK

4 cars 1 in. firsts and seconds.
1 car 1¼ in. firsts and seconds.
1 car 1½ in. firsts and seconds.
5 cars 1 in. No. 1 common.
1 car 1¼ in. No. 1 common.
1 car 1½ in. No. 1 common.

PLAIN RED GUM

5 cars 1 in. firsts and seconds.
2 cars 1¼ in. firsts and seconds.
1 car 1½ in. firsts and seconds.
5 cars 1 in. No. 1 common.
2 cars 1¼ in. No. 1 common.
2 cars 1½ in. No. 1 common.

SAP GUM

7 cars 1 in. firsts and seconds.
2 cars 1¼ in. firsts and seconds.
2 cars 1½ in. firsts and seconds.
1 car 2 in. firsts and seconds.
5 cars 1 in. No. 1 common.
1 car 1¼ No. 1 common.
1 car 1½ in. No. 1 common.
1 car 2 in. No. 1 common.

Will be pleased to name you prices on any items in Southern Hardwoods. If you require well-manufactured stock, containing good widths and lengths, we can serve you.

DERMOTT LAND & LUMBER COMPANY

General Offices 1559 Railway Exchange Bldg. CHICAGO, ILL.

Band Mill and Yards DERMOTT, Ark.

Long-Knight Lumber Co.

Manufacturers and Wholesale Dealers

INDIANAPOLIS, IND., U. S. A.

HARDWOOD LUMBER

Walnut, Mahogany and American Walnut Veneers

SPECIAL:

5 cars 5/4 1 & 2 Pl. Red Oak

FOR SALE

Black Walnut

Dimension Stock

5,000 feet 1 in. x 4 in. and up wide, 66 in. long.
5,000 feet 1 in. x 4 in. and up wide, 60 in. long.
10,000 feet 1 in. x 4 in. and up wide, 54 in. long.
20,000 feet 1 in. x 4 in. and up wide, 48 in. long.
5,000 feet 1 in. x 4 in. and up wide, 42 in. long.
10,000 feet 1 in. x 4 in. and up wide, 36 in. long.
25,000 feet 1 in. x 4 in. and up wide, 30 in. long.
20,000 feet 1 in. x 4 in. and up wide, 24 in. long.
15,000 feet 1 in. x 4 in. and up wide, 18 in. long.

The above is all Band Sawn and nicely equallized stock, all clear, and dry. Can ship mixed cars to suit your requirements. Write for prices on this stock, as well as anything else in Walnut Lumber Dimension Stock or Veneers that you may need.

Geo. W. Hartzell

Piqua, Ohio

We were Really Fortunate in the recent arrival of large, Prime, Figury

African Mahogany Logs

which we are now cutting into

1/28″ VENEER

These logs will produce at least TWO MILLION feet of veneer in:

Mottle—Broken Stripe—Straight Stripe Figure

In widths from 14″ to 28″. A large percentage in right width and figure for phonograph cases.

Advise promptly if you wish to see samples.

HUDDLESTON-MARSH MAHOGANY CO.

2254 Lumber St., CHICAGO **33 W. 42nd St., NEW YORK CITY**

We Have IT—
Soft Texture White Oak

150,000 Ft 1″ 1 & 2 PLAIN WHITE OAK bone dry, band sawed fine stock. Can ship immediately as all Canadian embargoes now lifted from our mill. Write ADAM KLIPPERT for prices on this or any other Hardwoods.

QUARTERED WHITE OAK, WALNUT, ASH, MAHOGANY, CHERRY, ETC.

Canadian Representative:
A. E. KLIPPERT
11 Laxton Ave., TORONTO
Phone Parkdale 1354

LELAND G. BANNING
CINCINNATI, OHIO

Anything in—

AMERICAN BLACK WALNUT

Square Veneers and Lumber for the Furniture Trade

LET US HAVE YOUR INQUIRIES.

Pickrel Walnut Co.

ST. LOUIS, Mo.

Crating Lumber

SPECIAL—1"x2" Crating Spruce. This is dressed one side to 7/8" and bundled, a very desirable lot.

Read Bros., Limited
43 Victoria Street
Toronto -:- Canada

Galbraith & Co., Ltd.
Owen Sound, Ont.
Manufacturers of
"Well-Made" Wood Specialties
Toys, Games, Turned Goods and Kitchenware
We Specialize on
CUSTOMS TURNINGS
Your order will receive prompt attention

Really Dry Hardwoods

M B

As evidence of the dryness of Martin-Barriss hardwoods we can refer you to many handsome interiors of elaborate detail.

Our process of drying requires three weeks during which time the heat and humidity of the kilns are kept at an efficient degree.

If our stock does not include the particular figure you want, we will gladly cut into new logs.

Have you our prices?

The Martin-Barriss Co.
Cleveland, Ohio

The Atlantic Lumber Co.
Manufacturers
Strictly Soft Textured
Quartered and Plain **White Oak**
Red Oak
Chestnut, Poplar, Cherry
Tennessee Scented Red Cedar
High Grades—Quick Shipments
110 Manning Chambers - TORONTO
Phone Main 6386
HEAD OFFICE, BOSTON MASS.
Mills: KNOXVILLE, TENN., WALLAND, TENN.
FRANKLIN, ARRINGDALE and BUTTERWORTH, VA.

ASH GUM
All Grades
WIRE FOR PRICES
Quick Service Guaranteed
Seven Million Feet in our yard
Aberdeen Lumber Co.
Pittsburgh, Pa.

J.V. Stimson & Co.

OWENSBORO, KENTUCKY

Manufacturers of

BAND SAWN HARDWOODS

QUARTERED and PLAIN OAK
ASH
POPLAR
HICKORY
WALNUT
QUARTERED SYCAMORE

OAK and WALNUT OUR SPECIATY

"Gum of Quality"

Yazoo River Red Gum

as produced by

Thomas & Proetz Lumber Company

3400 No. Hall St. St. Louis, Mo.

is carefully manufactured; soft in texture; dark, rich in color; and admirably suited for furniture and interior trim.

Mills—Belzoni, Miss.; Catchings, Miss.; Naples, La.

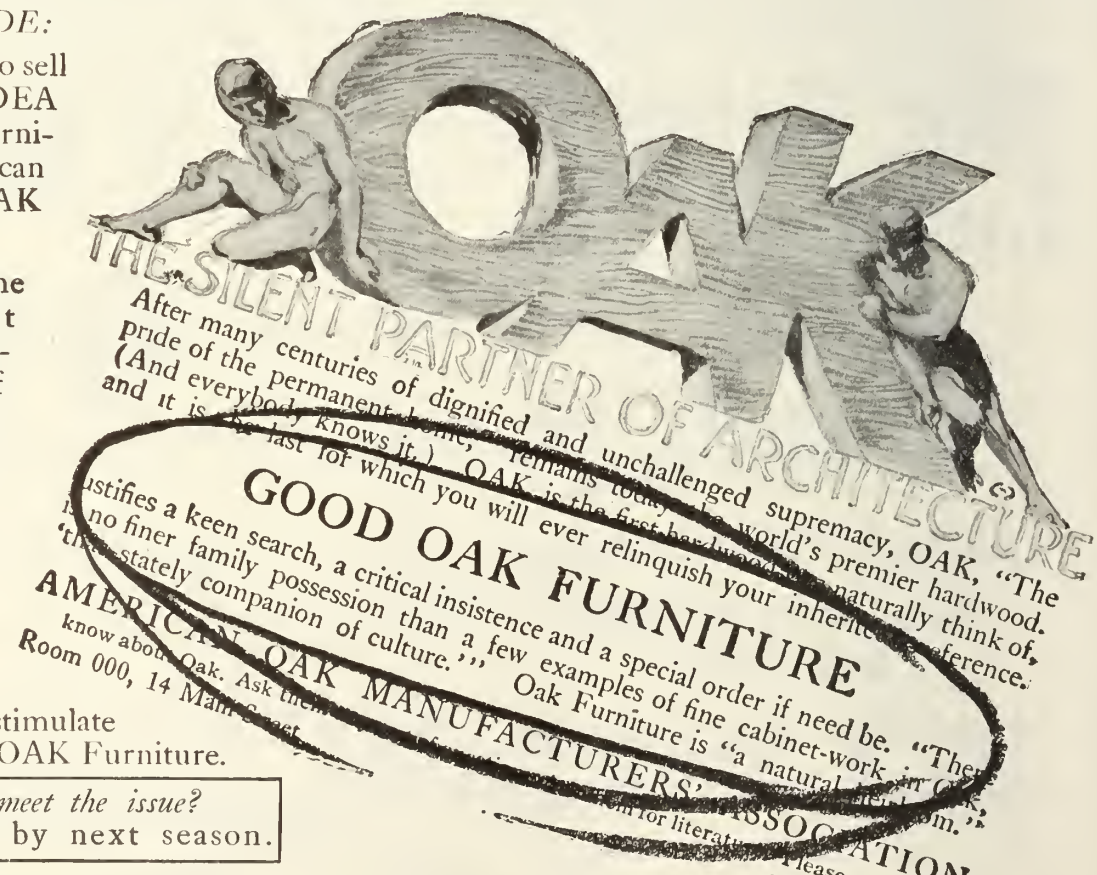
If you are not buying from us, write today.

TO THE TRADE:

We are going to sell the Public the IDEA of *Good* OAK Furniture—then you can sell the *Good* OAK Furniture itself.

THIS MONTH the advertisement shown here is given a circulation of 2,125,000 in the highest class magazines in America. You know, of course, that continued use of this sort of advertising will greatly stimulate demand for *Good* OAK Furniture.

Does your line meet the issue?
If not, it can by next season.

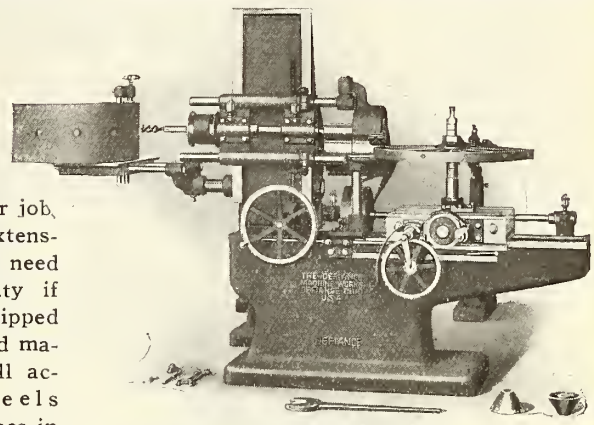

OAK
THE SILENT PARTNER OF ARCHITECTURE
After many centuries of dignified and unchallenged supremacy, OAK, "The
pride of the permanent home, remains today the world's premier hardwood.
(And everybody knows it.) OAK is the first hardwood you naturally think of,
and it is the last for which you will ever relinquish your inherited preference.
GOOD OAK FURNITURE
justifies a keen search, a critical insistence and a special order if need be. "There
no finer family possession than a few examples of fine cabinet-work in Oak,
'the stately companion of culture.'" Oak Furniture is "a natural choice for room."
AMERICAN OAK MANUFACTURERS' ASSOCIATION
know about Oak. Ask them for literature. Please address
Room 000, 14 Main Street, Memphis, Tenn.

AMERICAN OAK MANUFACTURERS' ASSOCIATION

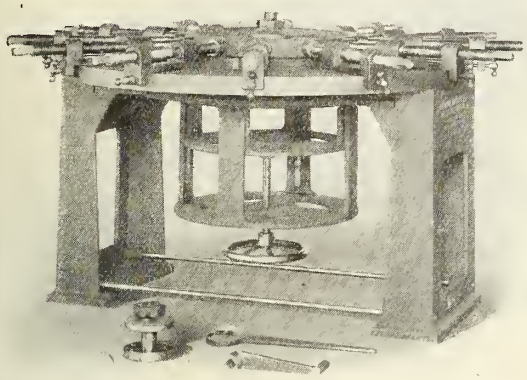
LET US CONSULT TOGETHER FOR THE GOOD OF ALL CONCERNED. WRITE US. WE'LL ANSWER.

ROOM 1408, 14 MAIN STREET, MEMPHIS, TENN.

REPAIR—REBUILD AUTOMOBILE WHEELS



No. 300 Universal Automobile Wheel Machine.



No. 305 Hand Power Automobile Wheel Assembling Machine

Not a single repair job, no matter how extensive it may be, need leave your locality if your shop is equipped with the illustrated machines. They will accommodate wheels from 18 to 42 inches in diameter, with felloes from the narrowest up to 14-inch tread. Similar designs with a range to take in artillery and wagon wheels can be supplied.

A WHEEL SHOP IN TWO MACHINES *THAT WILL*

Round both small and large felloes on the inside circle.

Bore the spoke holes in the felloes.
Cut miters on spokes for the hub.
Tenon spokes for the felloes.
Plane the side and size the tread of felloes.
Bore the centre of wheel for the hub.
Face the wheel for flanges.
Bore the holes for the flange bolts.
Assemble the wheel.

WRITE FOR DESCRIPTIVE MATTER AND QUOTATIONS TO

THE DEFIANCE MACHINE WORKS, Defiance, Ohio, U.S.A.

New York City **London, Eng.**

COAL SAVING

You owe it to the Empire that you get the utmost out of your Steam Plant. Your competitors have found that the use of our Boiler Preservatives, Protecto and Protectocoat for interior and exterior use on your Boilers are essential to get same along with Plibrico One-Piece Lining and Plibrico High Temperature Bond for repairs.

Everything in Paper Goods

PROTECTO

BOILER PRESERVATIVE

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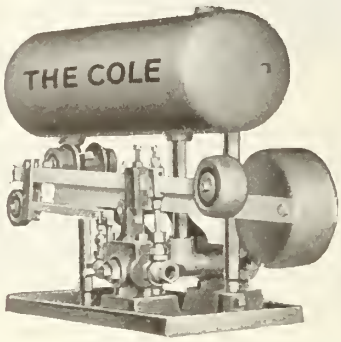

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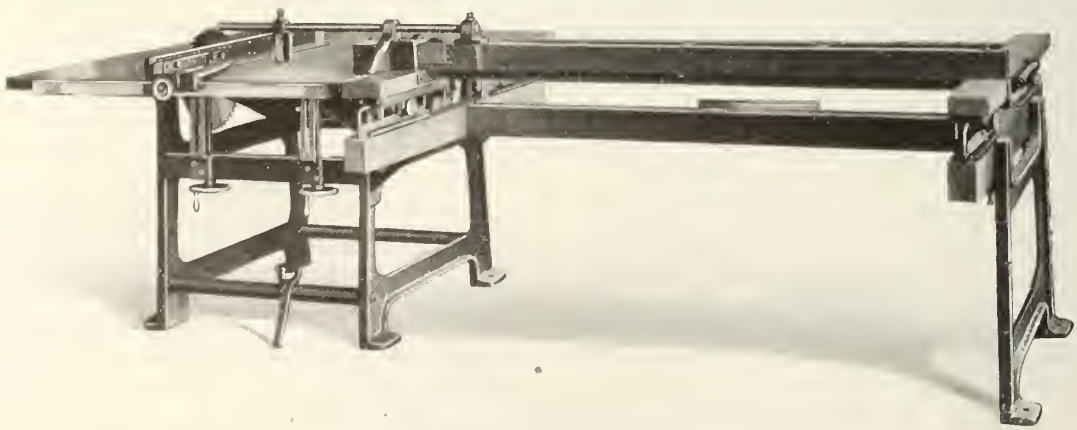

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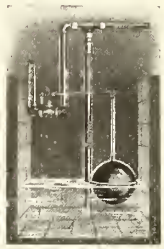

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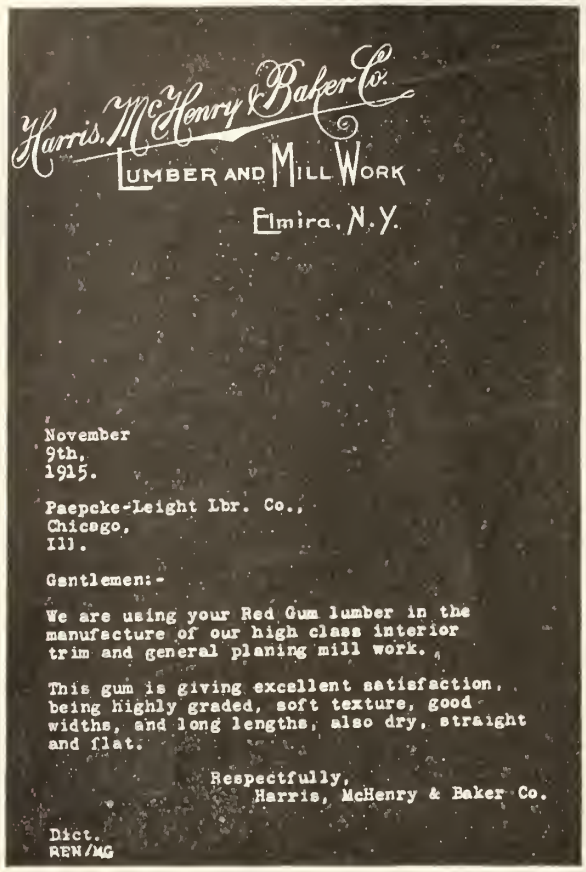
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Steam Power Production and Transmission

The subject featured in this issue of the "Canadian Woodworker and Furniture Manufacturer," is "Steam Power Production and Transmission." The steam engine has not been entirely superseded by electric drive. A number of manufacturers have told us that in spite of a number of features claimed for the latter they still prefer the steam engine. They state that where proper attention is given to the boiler room and transmission equipment and a suitable sum charged to heating the building and the operation of the dry kiln, that their power costs are quite reasonable.

A point made by several of the parties interviewed was that too many manufacturers feel that any ordinary labor will do for a fireman. An amusing incident was related by one superintendent as an illustration. He stated that some years ago he engaged a man whom, after he had interviewed him, he judged to be a competent fireman, but who turned out otherwise. At the plant at which he was superintendent at that time the coal was unloaded from the railroad cars into the company's yard cars. Some delay had been experienced in getting the railway company to place a car and as a consequence the coal bunkers were empty. One of the yard cars was therefore placed handy to the door of the boiler room where it was an easy matter to obtain sufficient coal with a wheelbarrow to keep the fires going until the coal bunkers were replenished. The superintendent stated that he was astonished to have the new fireman approach him in a very short time to request that he be furnished with another load of coal. Asked what he had done with the car he had he said he had burned it. He was then informed that he was much to expensive a fireman to be kept even if he worked for nothing.

Undoubtedly there is room for efficient supervision regarding the consumption of coal, the operation of boilers, the aligning of shafting and care of belts, bearings, pulleys, etc. It has therefore been our aim in this issue to present our readers with practical information regarding these essential features. The articles which we publish have been prepared by experienced men and we believe they are worthy of careful consideration.

Do You Read It?

On a recent trip covering several of the towns in eastern Ontario, the editor called on a large planing mill and box factory to have a chat with the man in charge. The manager was seated in the office surrounded by two or three of the town's "gentlemen" of leisure. On being questioned regarding business conditions he had nothing but complaints. He said that building in the town was dead and that his firm had not tried to land any shell box orders on account of the smallness of the price. When asked if he read the "Canadian Woodworker," his reply was that he got all the woodworking he wanted without reading about it. By lingering long to talk to this man one would be liable to form a bad impression of the town so he was left alone with his complaints.

The next plant visited had a different atmosphere. "Yes, the manager was around, but he was out in the factory; go right out and you will find him." He was found. He was busy loading shell boxes on a wagon. "Short of help," he explained, "but go and have a look around the plant and I'll be in the office in about fifteen minutes." When seen again in the office this manager stated that his plant had more work than they could handle. He reads the "Canadian Woodworker," and is going to write us an article just as soon as he can find time.

One went away from this factory with a more pleasant feeling. The next one visited was just as good. The manager was in the office and personally conducted the writer through the plant, apologizing for the lack of room to move around, and explaining that all he needed was a bigger factory and more help. In the cabinet room some partitions for an office building were being assembled. A question

about the amount of building going on in the town brought the information that it wasn't entirely dead, but that this firm did a lot of out-of-town work. The manager of this plant also reads the "Canadian Woodworker," and stated that he gets a great deal of useful information out of it. One subject he is anxious to see discussed is "Estimating for interior woodwork." When informed that this subject was on our programme for consideration he was pleased to hear it.

Now, readers, we leave you to draw your own conclusions as to why the first firm is not busy.

Uniformity in Trade Catalogues

Mr. W. L. Chandler, of the Dodge Sales & Engineering Company, Mishawaka, Ind., in a recent issue of The Purchasing Agent, presents some interesting thoughts regarding manufacturers' catalogues. He points out that the great economic waste caused by the issuance of catalogues ranging from small pamphlets to large and expensive bound volumes, which, owing to their lack of uniformity cannot be filed and classified, and thus find their way into the waste paper basket, can be conserved by the adoption of a master catalogue.

This, we believe, is a subject that might well be taken up by the Furniture Manufacturers' Association in Canada. We have in our office the catalogues of a number of Canadian furniture manufacturers. These vary in size from 12 x 5 ins. to 14 x 10½ ins. Practically all of them are printed on expensive paper and illustrated with costly cuts. They represent a considerable investment, and one cannot help but think, on looking them over, that the retail furniture dealers receiving them would have great difficulty in filing them so that they would be convenient for reference. Then again, furniture manufacturers are continually getting out new designs. When a number of these new designs have been added to the line it is necessary either to issue a new catalogue or a supplement to the existing one. This means added confusion for the dealer.

Of course, it is customary for the manufacturers' travellers to carry photographs of new designs, but once they have shown their photographs on their periodical visits and departed, it is almost impossible for the dealers to remember which particular firm's traveller showed them the new design they were interested in, but which they had not been in a position to stock just at the time. This is where the master catalogue would be of value.

Mr. Chandler, in his discussion on the subject, suggests that catalogues 8½ x 11 inches, on the loose leaf system, could be used, and that if a sheet of these dimensions is too small to accommodate the requisite data, a larger sheet—an exact multiple of this size—may be used, and folded to this size. Another suggestion he makes is that market reports and correspondence pertaining to the different price lists, such as quotations, discounts, or letters giving weights, freight rates or other data, being written on sheets of the same size as the catalogue sheets, could be filed with the sheets to which they apply.

We believe the retail furniture dealers would appreciate the adoption of a standard catalogue by the manufacturers, and also that the manufacturers themselves would benefit, as their catalogues would be much more easily referred to. It would be an easy matter to keep a record of the parties to whom catalogues were mailed. Sheets descriptive of new designs could then be sent to the names appearing on the list.

It might be desirable, in the case of manufacturers making more than one line, say house furniture and office furniture, to have separate catalogues. Details such as this, however, could easily be taken care of if a catalogue committee were appointed in connection with the Furniture Manufacturers' Association.

British Columbia Woods

In the June issue of the "Canadian Woodworker," considerable space will be devoted to a discussion of the characteristics of British Columbia woods for furniture and interior finish. These woods are now being used to some extent in Eastern Canada, and it is the intention to furnish our readers with practical information which will assist them to obtain the best possible results when using British Columbia woods.

A Commonweal Committee

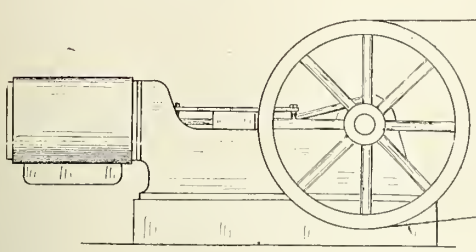
No more strikes or lockouts, an end of boycotting and blacklisting by the establishment of industrial amity between employer and employed, is the aim of the Commonweal Committee of the Oakland, California, Chamber of Commerce, which has just been organized and details of which have just been received

The Commonweal Committee, so we are advised, has been in process of formation for the last six months and therefore cannot be considered as a war measure. Its main purpose is to try to get back to first principles of industrialism—that is, revert to the days when the employer and employee were so close together that grievances could be threshed out man to man.

The membership of the committee consists of four union leaders and five members of the Chamber of Commerce as representatives of the employers. The union men insisted that they should be in the minority on the committee so that there should be no ground for the charge that they were attempting to dictate.

It is better to lose a job altogether than take the chance of losing money by doing it at an absurdly low figure.

STEAM POWER PRODUCTION and TRANSMISSION



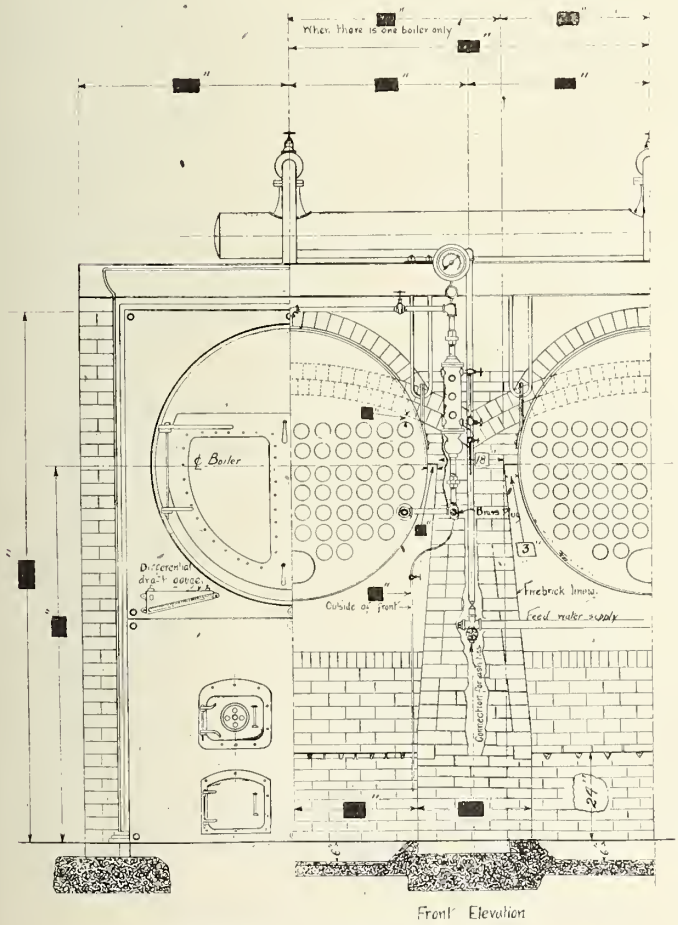
Setting and Operating the Boiler — Discussion on Belts and Bearings —Illustrations of Power Plant Equipment

Increasing the Efficiency of Boilers

By A M. Wickens, Industrial Engineer

There are very few factory owners who realize the real importance of the steam boiler. It is the heart of the factory; it generates the power; when it stops the whole business stands; it is a most faithful servant but a very bad master. It is said that cleanliness is next to godliness, and there is nothing to which this applies more directly than the steam boiler.

A boiler which is clean both internally and externally, if well set and carefully fired, will utilize from 60 to 70 per cent. of all the heat in the fuel, while if it is badly set, carelessly cleaned and poorly fired, its efficiency will drop below 50 per cent. Aside from this a dirty boiler will soon call for repairs, and is more susceptible to explosion. The energy in a 100 horse power steam boiler having a pressure of 80 lbs. per square inch would, if all exerted in one direction project the boiler, which weighs between five and six tons, to a height of about two miles. It is therefore plain that the element of "safety first" comes in here very strong.



Front elevation of standard boiler setting.

I have heard a man say "Oh, my boiler is perfectly safe; it is made of steel and I have only had it about twenty years." Now a steam boiler is subject to continual strains, to continual expansion and contraction, to carbonization on account of the heat from the fuel, and in fact to a general slow and steady weakening during its whole life. Consequently the time comes when its usefulness is gone—when for safety the working steam pressure must be reduced.

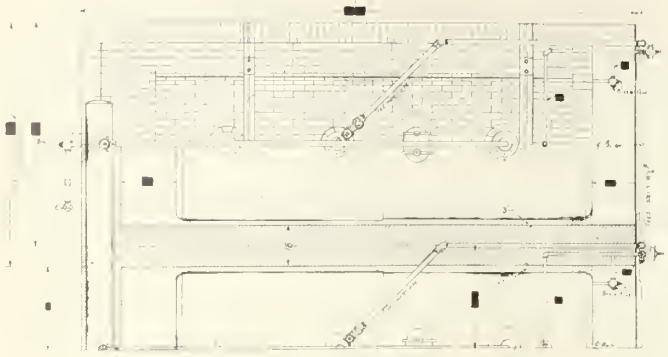
Type of Boiler

The most popular boiler in Canada for woodworking factories is the horizontal return tubular boiler. The reasons are: 1st, because of its cheapness compared to other makes; 2nd, because of its low cost for upkeep and repairs; 3rd, for its facilities and cheapness for cleaning. This class of boiler will, where conditions of operation are alike, make as much steam per pound of fuel burned as any of the high class water tube boilers. By alike conditions I mean the same proportions of grate surface to the heating surface, the same amount of chimney draft, the same care taken in the brick setting and burning the same number of pounds of the same fuel per square foot of grate surface, per hour.

In selecting the boiler have one of ample power, that is, of sufficient capacity for all the machinery and a margin of not less than 30 per cent. to care for transmission losses. The term "horse power" as applied to a boiler is almost a misnomer, as a boiler only generates the steam, which is converted into power by the engine. A boiler horse power is its ability to evaporate 34 lbs. of water per hour into steam of 75 lbs. pressure, irrespective of what the same is used for.

Boiler Setting

In setting the boiler the situation should be such that it is convenient to the engine and also that the fuel may be carried to it directly and cheaply. Having fixed the location, the next thing to be considered is the brick work about the boiler. It costs no more to set the boiler so as to secure good results from the fuel than poor ones. The sidewalls should be of ample thickness to carry the weight and retain the heat. The



Plan of boiler setting.

walls should be well bound with headers every third or fourth course. The walls should be carried up to just above the centre of the boiler. At this point a space of three inches should be left and then the work closed in.

The first two courses of brick should barely touch the boiler, to allow for expansion. The fire box or furnace should be lined with firebrick. The front arches over the fire doors, the face of the bridge wall and the face of the back wall and arch should also be lined with fire brick. The bridge wall at the end of the grates should rise to within 12 inches of the bottom of the boiler and be straight across from side wall to side wall. The grates for shavings and small refuse should be one square foot to 45 square feet of heating surface in the boiler. They should also be from 48 inches to 54 inches below the bottom of the boiler. Behind the bridge wall the space should get deeper as it goes back, starting from top of bridge wall and finishing at the back end of the boiler at from 36 inches to 48 inches below the bottom of the boiler. This form of setting will give excellent results.

Any cracks developing in any of the walls should be immediately stopped as leakage of air into any part of the setting is a decided loss. A boiler with ample draft set in this way will make very little smoke. The illustrations accompanying this article show a standard form of boiler setting. It will be noticed that where the measurements should be there are small black squares. These black squares are on the tracing and when a blue print is made they show white on the print. The measurements can then be put in on the white squares. This does away with the necessity of scaling the drawing, and one tracing will last indefinitely.

Care of Boiler

As suggested before, there is no place in the factory where cleanliness will pay greater returns than in the care of the boiler and its surroundings. All boilers should be washed out regularly; the cover plates should be removed and the whole washed down by a good sharp stream from the hose. All extra soot deposited on boiler bottom and heads should be swept off. Soot is one of the best non-conductors of heat known. In use the tubes should be blown out daily and should be scraped out with a tube cleaner twice a week.

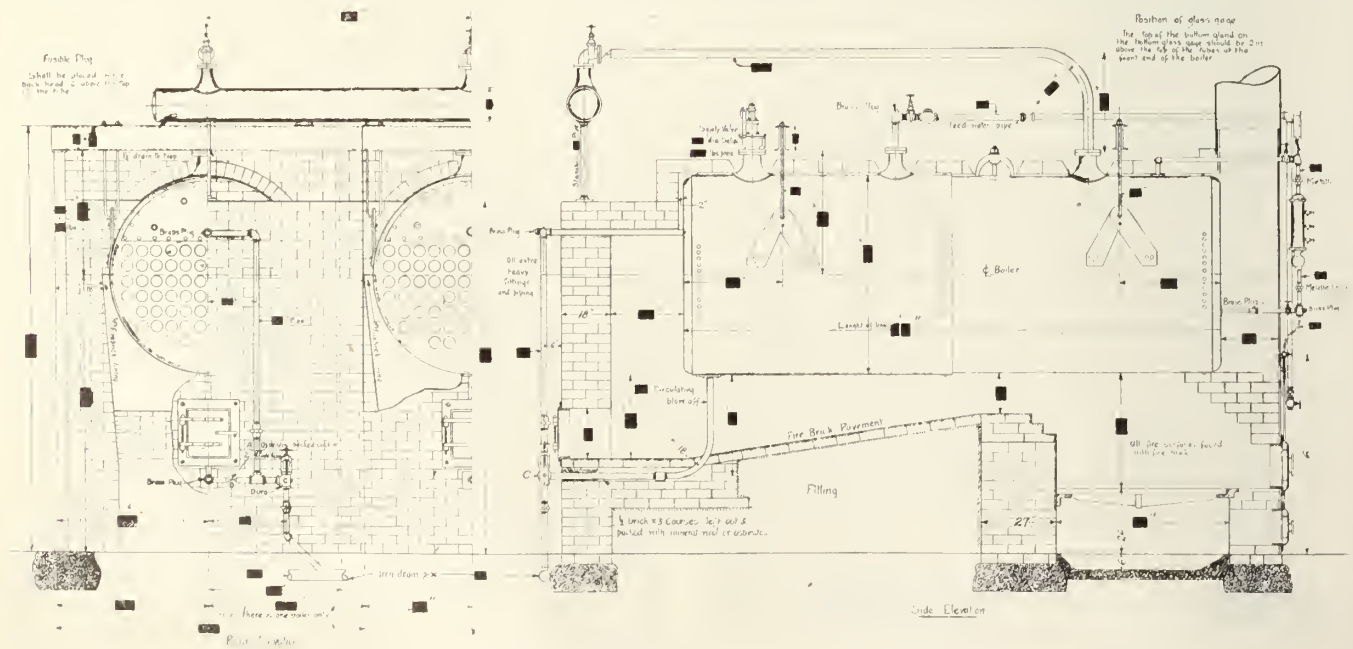
Boiler Scale

All waters, except rain water, have more or less scale-making properties in them. A water carrying forty grains of scale per gallon is a hard water for boilers. A 100 h.p. boiler will require 3,400 gallons of water per day of ten hours. In a run of 60 hours this will deposit 100 lbs. of scale, sufficient to deposit 1/16 of an inch thickness over 50 square feet of surface. It has been fairly demonstrated that 1/16 inch of scale requires from 8 to 10 per cent. more fuel. About 2 inches of water should be blown off daily through the blow off valve.

Oil in Boilers

In all factories where the exhaust steam is used for kiln drying or other processes of manufacture and where the water of condensation is returned to the boilers, care should be taken to remove all the cylinder oil from the water. Oil is a very bad conductor of heat and if it ever reaches the lower sheets of a boiler it causes leaks and also causes the sheets to buckle and bulge down, thus soon making expensive repairs necessary.

From recent experiments it was shown that with a clean sheet supplied with clean water no injury was done to the sheet even when the fires were forced to the utmost. It was found that the temperature of the sheet on the fire side was 430 degrees F. and on water



Side and rear elevations of boiler setting.

side 360 degrees F., only a difference of 70 degrees. This was for steam at atmospheric pressure, and would be proportionately the same for all higher pressures. If a very thin coating of oil was applied on the water side, the fire side of the sheet would have a temperature of 550 degrees F., and the water side only 351 degrees F., a difference of 199 degrees F. Heavier oil coating increases the temperature on the fire side of the sheet. The thinnest coating of oil reduced transmission from the fire to the water 11 per cent.

Small Leaks

An uncovered pipe 3 inches in diameter, 30 feet long, will condense one pound of steam per hour for each square foot of its surface. This means 20 lbs. of water per hour for 12 hours per day, or 240 lbs., and for 300 days 72,000 lbs. of steam. If the boiler is evaporating 7 lbs. of water per pound of coal it means 5¼ tons of coal per year, and at $4 per ton, represents $21.00.

We also see many small leaks about the boiler fittings. A round hole 1/16 of an inch diameter has an area of .00307 of a square inch. This is a small hole, but it will discharge .307 of a pound per minute or 220 pounds in 12 hours or 66,300 pounds per year, and on a basis of 7 pounds of water evaporated per pound of coal, equals $18.94 per year.

So for success set the boiler well, keep it clean, stop all small leaks and run the factory full ten hours every day.

The Purification of Feed Water

By Engineer

Water containing scale-producing properties may often be sufficiently purified by allowing it to stand quietly for some time in large reservoirs or tanks, when the impurities will settle out. While this method is fairly satisfactory as far as earthy matter is concerned, it will not clear the water of finely-divided organic matter, which is usually lighter than water and often so finely divided as to appear almost dissolved in it.

Impurities in suspension, such as oil, grease, and earthy matter, may be removed by filtering through layers of fine sand, hay, or even cloth. This treatment will not remove substances in solution.

The method of purifying feed water by heating is based on the fact that most of the scale-forming substances becomes insoluble and are precipitated when the water containing them in solution is heated to a high temperature This is accomplished in any of the various types of feedwater heaters

When the water in the boiler contains large quantities of foreign substances floating on the surface, purification may be accomplished either by blowing off the surface or skimming. Sometimes trays or other vessels are placed in the boilers to catch sediment as it is precipitated from the entering feedwater. These vessels are so situated that the feedwater must enter them before mixing with the main contents of the boiler. When sufficient sediment has been collected, or at regular intervals, the trays are removed and cleaned.

Proper chemical treatment of water will render the scale-forming substances and corrosive acids harmless. The treatment may be made either before or after the water enters the boilers, preferably before. When the water is very bad, recourse must be had to treatment by chemicals in tanks, and subsequent slow settling or filtration to remove the sediment formed. Hydrate, or milk of lime, caustic soda, and carbonate of soda are the chemicals used. This method requires a somewhat expensive equipment and great care in its operation.

A method commonly used is to introduce periodically into the boiler a solution of some chemicals, such as caustic soda, tannate, carbonate and phosphate of soda, or prepared boiler compounds, etc., which will cause the scale-forming materials either to be precipitated in the form of mud, which can be blown or washed out, or hold them in solution so that they may be got rid of by frequent blowing down. Free acids are neutralized and rendered inactive. For introducing these solutions of chemicals into the boiler various devices are in use.

Acid feedwater may be neutralized by attaching slabs of zinc to some part of the inside of the boiler. Zinc is sometimes used in conjunction with soda ash, which partly neutralizes the acid; the neutralization is completed by the zinc. The action is electrolytic, the zinc being dissolved by the acid while the iron remains unaffected. Before a slab is entirely dissolved it should be replaced by a new one. The above table gives briefly the most common impurities and their effects and remedies:

Troublesome substances.	Trouble.	Remedy.
Sediment, mud, clay, etc.	Incrustation.	Filtration, blowing off.
Readily soluble salts.	Incrustation.	Blowing off.
Bicarbonates of lime, magnesia and iron.	Incrustation.	Heating feed, addition of caustic soda, lime, or magnesia, etc.
Sulphate of lime.	Incrustation.	Addition of carbonate of soda, barium, chloride, etc.
Chloride and sulphate of magnesium.	Corrosion.	Addition of carbonate of soda, etc.
Carbonate of soda in large amounts.	Priming.	Addition of barium chloride, etc.
Acid.	Corrosion.	Alkali.
Dissolved carbonic acid of oxygen.	Corrosion.	Heating feed, addition of caustic soda, slacked lime, etc.
Grease (from condensed water).	Corrosion.	Slacked lime and filtering. Substitute mineral oil.
Organic matter (sewage).	Priming.	Precipitate with alum of ferric chloride and filter.
Organic matter.	Corrosion.	Precipitate with alum of ferric chloride and filter.

Practical Suggestions for Factory Firemen

Hints on Building Fires—How to Obtain Proper Combustion and Eliminate Smoke—Maintaining Fire Between Cleaning Periods.

By Charles H. Bromley

It is the duty of engineers and firemen to smokelessly and economically burn fuel—first because combustion is part of their everyday work, and second, because personal and civic pride demands that they do their best to beautify or to preserve the beauty of the community. In this article bituminous coal is considered exclusively, and the best methods of burning it in hand-fired horizontal tubular boilers as demon-

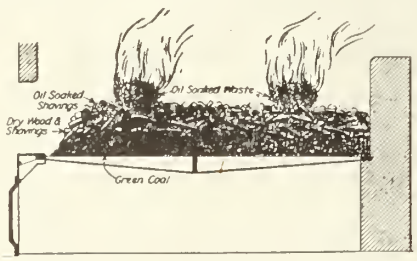


Fig. 1.

strated under commercial conditions. However competent the man, smokeless and economical combustion is commercially impossible unless the furnace is suitable; that is, has volume, proper proportions and adjuncts. Without these essentials—namely, draft, temperature, time, and gas and air mixing provisions—good combustion cannot be had.

A typical soft coal has the following principal constituents as received: Fixed carbon, 57.6 per cent.; volatile, 32.24 per cent.; ash, 7.32 per cent.; moisture, 2.84 per cent. The coal is a solid. On being burned everything but the ash and what combustible remains in it is driven off as a gas accompanied by a small quantity of fine solid particles. The volatile matter consists largely of oils which will distill off, some at temperatures a little below 300 degs. F., and others, the heavier ones, at 800 to 950 degs. F. Running normally, the furnace temperature will be about 1,800 to 2,500 degs. F. (hand-firing)—from six to eight times as high as needed to support distillation. After these oils vaporize and gasify, they must receive enough air for their combustion, must have sufficient temperature to carry on combustion and must be well mixed with the air for combustion. And all this should happen before the gases get into the boiler tubes; in fact, for best results the whole combination of events should be completed before the gases touch the heating surface at all—in less than a second.

When Osborne Monnett tackled the job of cleaning Chicago of smoke, he found over 90 per cent. of the boilers were of the horizontal return-tubular type having settings wherein the distance from grate to shell was not more than two feet. This condition is true of most cities, but fortunately is becoming less and less, owing to the vigor of smoke abatement campaigns.

To build a fire in a cold boiler without making objectionable smoke, is regarded as at least extremely doubtful by the average man. But it can be done. Here is the way H. H. Maxfield, superintendent of motive power, Pennsylvania R.R., does it in locomotives, and the method is applicable to stationary boilers, perhaps, with better results for the same skill applied.

The entire grate is covered with 3 inches of gas coal (assumably a coal containing from 32 to 38 per cent. volatile) spread evenly, and upon this is laid a layer of low-volatile coal (about 20 per cent.) thoroughly wet to a depth of 4 in. Dry wood shavings are then spread over the surface of the coal, after which an ordinary bucket of shavings soaked in crude oil is distributed on top of the dry shavings. A piece of oil-soaked waste is thrown into the middle of the grate to ignite the shavings (see Fig. 1). The blower is opened very lightly and the opening increased as the

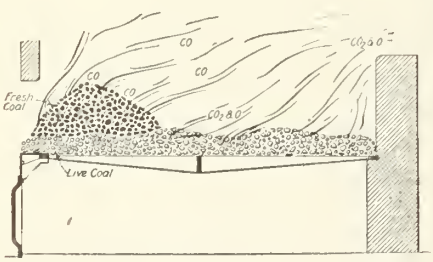


Fig. 2

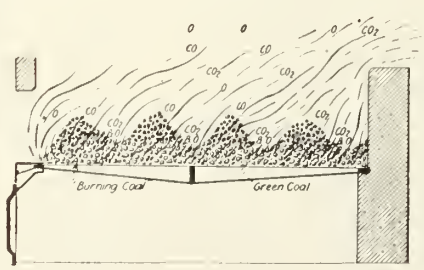


Fig. 3

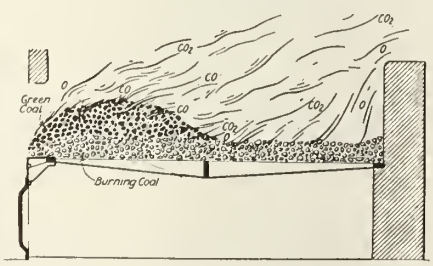


Fig. 4

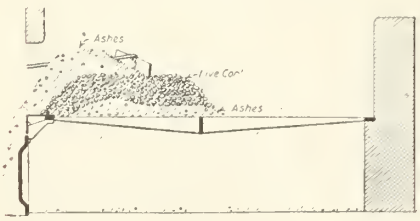


Fig. 5

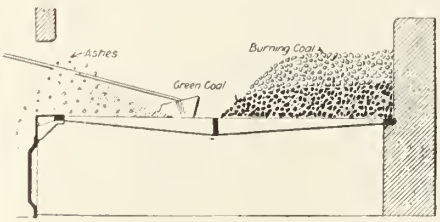


Fig. 6

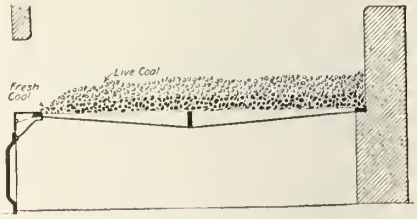


Fig. 7

Showing methods of building and cleaning fires.

coal becomes ignited. The first-door is kept open until after the coal is burning, or longer, depending upon the condition of the stack. Sometimes more coal is needed before a good fire is had, and if so, wet low-volatile coal is used. The gas coal is used to prevent the low-volatile coal from falling through the grate.

This method of building a fire is correct from every viewpoint. The fire burns from the top down, causing the volatile to pass through a zone hot enough to completely gasify the vapors. The fire should not be sliced or hooked or otherwise disturbed. The method is applicable to a stationary boiler, and although the low-volatile coal may not be easily had, coal from the everyday supply will do. Fig. 1 shows the method applied to a stationary boiler.

Maintaining the fire between cleaning periods requires no mean skill. The coking method with which every fireman who reads should be familiar is not always the best. A glance at Fig. 2 shows that only a small part of the total surface of the green coals coking is exposed to the direct heat of the furnace. If the pile of coal coking could be left there long enough, the volatile would be driven off so slowly as to make no objectionable smoke. But it must soon be pushed and spread over the hot fire, and when this is done the volatile in the coal beneath the surface of the pile has reached a temperature where only a slight increase is needed to make it give forth its vapors so suddenly as to not give time for adequate mixing with air, thus making dense black smoke. The lowered furnace temperature also helps to make smoke at this time. All this is clear when we realize that the rapidity of distillation depends, for any given temperature, upon the surface of coal exposed to the heat. Less smoke will be made, even with a "puffy" coal, if the pile is spread as in Fig. 3, and if steam-air jets or other means of getting air in over the fire are used.

The alternate method of covering has the same disadvantage, in that the green coal, even though thrown on but one-half or one-third of the fuel bed, has so much of its surface exposed at once to the incandescent coal that distillation is more rapid than can be cared for by the air admission. Unfortunately, too, these vapors should receive heat as they go on their way to the uptake instead of losing it. With this method the gases do not pass directly over an incandescent area, as they do when the coking method is employed. Someone, I forgot who, has suggested a way to cover in which the green coal is thrown in small piles well distributed over the burning fuel, and later, when most of the volatile has been distilled, these piles are leveled (see Fig. 4). The idea is to gradually expose the whole charge of coal to the direct heat of the furnace. Theoretically the method is good, but it is hard work for the fireman and unfortunately gets him into the habit of disturbing the fuel bed with rake or slice bar, a most egregious fault.

Whether the coking, alternate, or the divided method of covering is used, or if the whole fire surface is covered at once, the covering must be thin and done frequently. This is particularly true of caking coals. Caking coals form the surface crust so peculiar to them during the coking process. The crust prevents sufficient air reaching the coal, and high spots form in the fuel bed. If these places are covered with fresh coal before the surface of the high spots have been broken and allowed to burn away, the trouble grows worse. Do not cover unburned places in the fuel bed. The troubles had with many caking coals may be made nearly negligible if the fire is always covered lightly and often. Use the rake and slice bar as little as possible, but remember that the crust of caking coal must be often broken, if formed, to maintain the desired steam pressure. When breaking the crust, be careful not to so disturb the fuel bed as to get ashes on or near the top of the fire. Usually this causes serious clinker trouble, which stops the normal flow of air through the fuel bed and gives rise to more caking.

For a not too-heavy covering and at normal hand-firing combustion rates, it takes from 2 to 6 min. for the volatile to be driven off. During the major part of this time use the steam jet if provided or open the fire-door to admit air in above the fire. The time it should be left open depends, of course, upon the rapidity of distillation and the quantity of the vapor and gas distilled.

From the smoke standpoint the difficult time to prevent smoke is during the cleaning period. First be sure that there is sufficient live coal when cleaning begins.

There is probably no more practicable satisfactory way of cleaning a fire than that shown in Figs. 5, 6 and 7. The back half of the grate is first cleaned as shown in Fig. 5, then about 3 inches of green coal is thrown on the bare grate and all the live coal pushed back on top of the green coal, which begins to burn from the top down, making it necessary for the vapors and gases to pass through the hot coal (see Fig. 6). The ashes are pulled from the front of the grate, green coal thrown on and the live coals at the back pulled forward and evenly distributed over the whole fuel-bed surface, Fig. 7.—Power.

Cost of Generating Power

The following interesting letter on the subject of power costs was recently received by the secretary of the Furniture Manufacturers' Association from a prominent Ontario furniture manufacturer in reply to a query addressed to him (the furniture manufacturer):—

"The getting of exact information in reference to the cost of power in furniture plants is so uncertain that very few are able to tell what their power really costs them. In fact I would be inclined to doubt if they can tell the actual amount of power they use. The actual cost of generating steam or electrical energy is so varied in different plants that no two manufacturers seem to agree. One will add the cost of his engineer and everything in connection with the equipment, while another says "well, I have got to have an engineer anyway, for other purposes, and it really costs me nothing." Others do not take into consideration that their refuse is a large item and could be disposed of at a remunerative price if they did not burn same.

I have heard intelligent manufacturers, who should know, claim that they can generate steam power ten hours per day for less than $22 per h.p.

"At the time of the inauguration of the Hydro Electric Power scheme in Ontario, in which I was interested, I took up the question of cost of power throughout the United States, and found that the traction companies in New York who generate their own power with an up-to-date equipment and with coal at $1.50 per ton delivered, claim it costs them for 24

hour power over $51 per h.p. Statistics from all over the United States prove that 24 hour power cannot be generated from coal for less than around $60 per h.p. under extremely favorable circumstances.

"I therefore waive my own opinion in deference to people who have a much better chance of knowing, and take it for granted that if I can buy power for anything near $35 per h.p. I cannot generate it myself at anything like that price when coal costs $4 per ton delivered. I have come to the conclusion that woodworking factories get the maximum benefit from putting in steam equipment and generating power to the average amount of steam required to heat their plant during the winter months, using the exhaust for heating purposes. Any excess power required over this amount, if it can be secured below $40 per h.p. should be purchased and used as auxiliary power to make up what they require, even if coal costs $3.50 to $4 per ton delivered.

"Regarding electrical drive: where a steady drive is absolutely necessary the individual motor is undoubtedly the best. It costs more to install a number of motors than one large motor, and if the load is regular one motor on regular shaft is undoubtedly better, but where a number of machines used at different times can be grouped together, then a motor sufficient to run the maximum amount required at one time will undoubtedly prove cheaper. One advantage in using motors is that if the power has to be transmitted over a long distance it can be done much cheaper than transmitting steam power over the same distance.

"In regard to heating, I have never made an actual test, but our experience is that you can heat a building better by exhaust steam than by live steam, as reducing valves are an unknown quantity and carrying steam at 120 lbs. pressure where the heating system is built for about 6 lbs. pressure the exhaust steam gives far better results than any reducing valves ever gave.

"In summing up the situation, may say that this question is too big to answer in one letter, and the opinions so varied and the data so unreliable that after you have got all the information together you have about as little as when you commenced. It is much the same as the question "Which is the proper way to dry lumber?" That question has never been satisfactorily answered, although I can find hundreds of men who think they have solved the question. I myself have not solved it, and do not believe anyone else has.

"In the first place, how many people know what an h.p. is, and how many know exactly the amount of h.p. they use on a varied load running ten hours per day? This question is something similar to the cost of production. There are about 1,000 ways of figuring, and every manufacturer figures differently, so there you have it."

Ball Bearings as Power Savers

In This Article Are Given the Results of Some Tests Made at the Canadian National Exhibition on Babbited Boxes and Boxes Fitted with Ball Bearings

Ball bearings as a power-saving feature in transmission apparatus are an accepted fact in modern engineering circles. All progressive engineers are familiar with the evolution of the ball-bearing from the crude unreliable devices of the pioneer bicycle days to the product of highly specialized factories. With ever-rising costs of production in labor and material, manufacturers have, during recent years, been compelled to consider every possible means of obtaining economy, with the result that power transmission losses are now subject to continuous investigation in practically all lines of manufacturing.

Established in this country in 1902, the Chapman Double Ball Bearing Company was formed to develop patents granted to C. A. Chapman, and since then have been continuously engaged in the production of various types of ball bearings for power transmission equipment, and special and general machinery.

The Chapman ball bearing as adapted for the majority of general shafting work is of the cup and cone type, two double opposed ball assemblies being mounted in the ends of a cast iron housing. The details of construction are clearly shown in the illustration, Fig. 4, while the external appearance of the bearing mounted in an ordinary shafting hanger is shown in Fig. 6.

A consideration of the features exhibited in these illustrations brings out two salient facts concerning this design of bearing—first, by using two sets of ball races in the manner shown, the dimensions of the housing are retained within limits which make the bearing completely interchangeable with existing self-oiling boxes of the same shaft sizes in any standard type of hanger frame; second, as a result of the first feature there is practically no limit to the size of ball or diameter of ball race which can be incorporated in any one size of bearing. Due to the latter fact, therefore, these bearings possess an exceedingly high carrying capacity largely in excess of any load which the corresponding size of shaft would be able to sustain continuously. Under all ordinary factory conditions, therefore, the factor of safety is more than ample to insure a very long period of service. Fig. 1 shows Chapman ball bearing equipment installed in the woodworking shop of the International Harvester Company's plant at Hamilton, Ont.

Pulley and Clutch Applications

Fig. 2 shows the interior arrangement of a loose pulley bearing or bushing, which has proven satisfactory in overcoming inherent troubles of ordinary loose pulleys. In addition to saving time and trouble through heating due to neglect or overload, these pulleys effect substantial economies in lubrication and necessary attention. The lubricant used is a high grade vaseline which does not leak like oil or get thrown around, increasing fire risks or damaging goods, and as the sleeve in contact with the shaft does not revolve there is no wear on the shaft with consequent depreciation. Fig. 3 shows the pulley. Clutch sleeves are a kindred item of power transmission equipment which have been also standardized in ball bearing types, the sleeve in this case being secured to the

shaft with wedges in the same way as the shaft bearing.

The following paragraphs, taken from a report by Roderick J. Parke, a mechanical engineer, who made some tests on the relative efficiencies of Chapman Double Ball Bearings and ordinary babbited bearings at the Canadian National Exhibition, several years ago, will undoubtedly be of interest to readers:

Equipment Tested

The equipment under test consisted of a shaft 6 feet 6 inches long and 2-15/16 inches in diameter, supported at each end by the bearings to be tested, these bearings being carried upon standards. Between these standards two other bearings were placed upon the shaft in such a manner as to transmit to the shaft and outer bearings a load or pressure applied through the medium of a hydraulic jack operated by a hand pump, the pressure thus applied corresponded to the side pull of the belting driving and driven by the shaft as usually found in industrial plants. A pressure gauge reading directly in tons indicated exactly the amount of the transverse load thrown directly on the bearings. On one end of the shaft was placed a driving pulley to receive the belt driven by a 15 h.p. electric motor, which furnished the power for the test. Fig. 5 shows the equipment with standard or ordinary journal bearings, and Fig. 7 shows the same equipment with Chapman Double Ball Bearings.

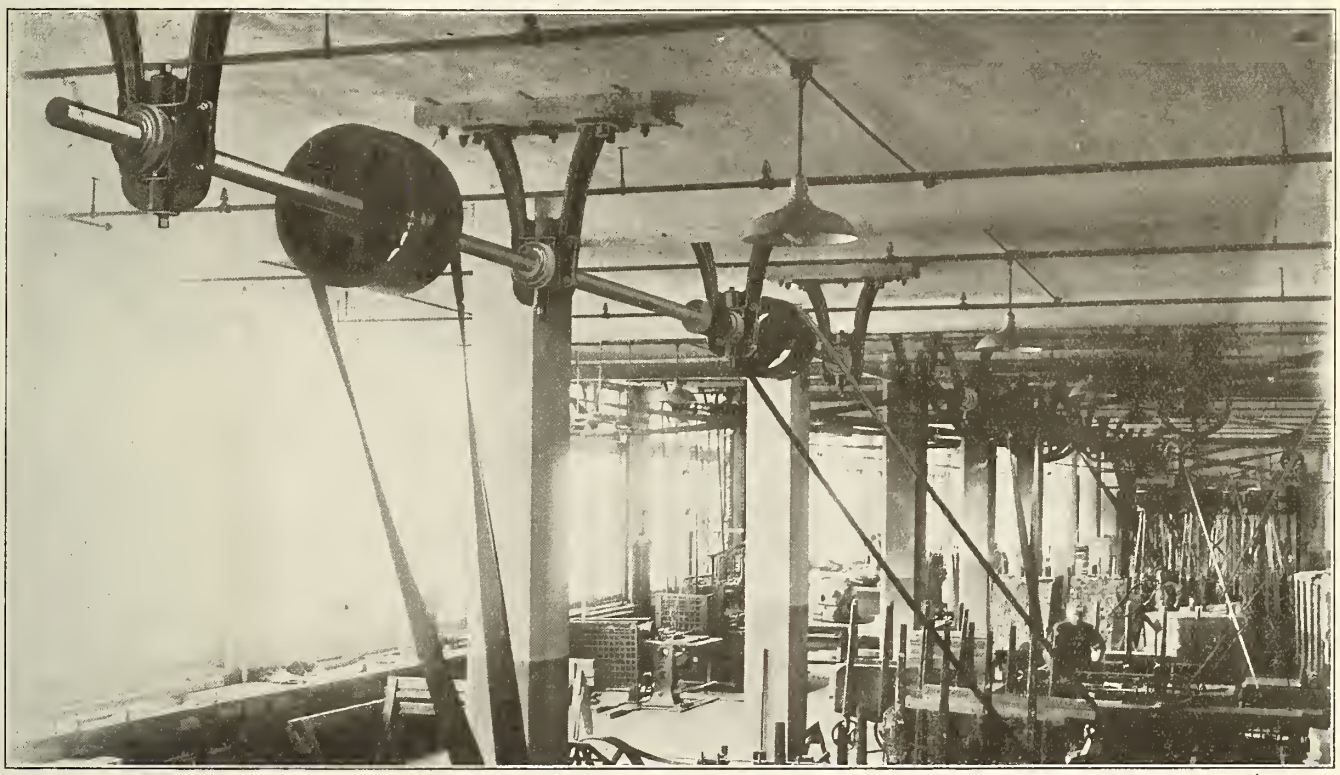


Fig. 1—Chapman ball bearings on line shaft in woodworking shop of International Harvester Company, Hamilton, Ont.

Power Supply and Instruments Used in Tests

An ample supply of electrical energy in the form of continuous current at 220 volts was available for the operation of the 15 horse-power electric motor which was used for driving the shaft during the test. A Thomson direct current wattmeter was connected to the electric supply circuit. This wattmeter was correctly calibrated and was connected in such manner that the actual power consumed by the motor was read directly on the instrument. A tachometer was used in determining the speed of the shaft.

Details of Test

Test No. 1 was made on the shaft equipped with four standard or ordinary journal bearings referred to above and arranged as shown in Fig. 5.

Test No. 2 was made on the same shaft equipped with four Chapman Double Ball Bearings, referred to above and arranged as shown in Fig. 7.

During the test of the ordinary bearings the latter were kept thoroughly lubricated with a good quality of machine oil, and the bearings were adjusted in such manner that the contact surfaces were evenly distributed throughout the entire length of each bearing.

No lubrication was used for the Chapman Double Ball Bearings.

		Saved
Shaft running idle	150 W.	$ 6.03
Shaft transmitting 20% of its capacity	300 W.	20.10
Shaft transmitting 40% of its capacity	880 W.	35.37
Shaft transmitting 60% of its capacity	1250 W.	50.25
Shaft transmitting 80% of its capacity	1650 W.	66.33
Shaft transmitting its full capacity	1900 W.	76.38
Shaft transmitting 20% more than its capacity	2020 W.	81.20

The above table shows the relative commercial efficiencies of the two kinds of bearings tested. The term "Commercial Efficiency," as used herein, means the efficiency of the bearings in dollars and cents, or in other words, the amount of money which can be saved annually by operating the more efficient bearings, which in this case are the Chapman Double Ball Bearings, as determined by the test.

In order to establish a fair basis of valuation, I am

assuming that the manufacturer will purchase or generate his power at a cost of 1 cent per horsepower per hour, which on the basis of 3,000 hours of factory operation per annum is equivalent to a cost of $30.00 per horsepower per annum, and upon this figure the values given in the table are therefore based. In my opinion, $30.00 per horsepower per annum is the lowest figure that can be obtained at present in the average plant.

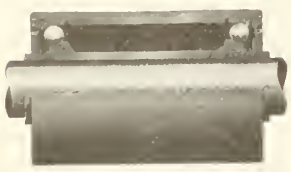


Fig. 2—Showing interior arrangement of loose pulley.

Fig. 3—Loose pulley with ball bearings.

I may say that as a result of many tests of power plants I have made, I have not been able to find any in which the cost of the power in units of total loads smaller than 200 horsepower, was below $30.00 per horsepower per annum, notwithstanding the fact that the proprietors in many instances believed they were producing their power at $15.00 or $20.00 per horsepower. I have found many cases in which the cost of power was actually over $100.00 per horsepower per annum, whether the power was purchased from outside sources or manufactured on the premises from steam power.

I have to point out an interesting fact, viz.: that although the safe working capacity of the shaft was exceeded at six tons load, the saving in the expense for power when the Chapman Double Ball Bearings were used, continued to increase almost proportionately with the increase of load, instead of materially diminishing as might have been expected.

It is a fact that the Chapman Double Ball Bearings require no lubrication, hence the comparative saving shown in the table will be increased by the equivalent cost of oil required for the ordinary bearings. The expense of maintenance of the Chapman bearings is also very much less than that of the ordinary bearings. I have ascertained this fact by personal investigation. In one instance I inspected a shaft equipped with Chapman Double Ball Bearings which had been in service for over three years and six months, and to all appearance the bearings are in as good condition as when they were installed, and during that time they had required practically no attention.

The point of vital importance to the consumer is the fact that the actual saving of power in one Chapman Double Ball Bearing only, when the shaft is transmitting its maximum normal capacity, is over $19.00 per annum, when motive power is costing only one cent per horsepower per hour, or $30.00 per horsepower per annum, for ten hour power, 300 days a year. Where power costs more than $30.00 per horsepower the saving will be proportionately greater.

Belts for Woodworking Plants

By James Clark

The problem of belting is one of the live subjects in woodworking plants, because a woodworking plant uses up more belting in proportion to its machine equipment than any other, with the possible exception of a paper mill, but as paper mills are not a common

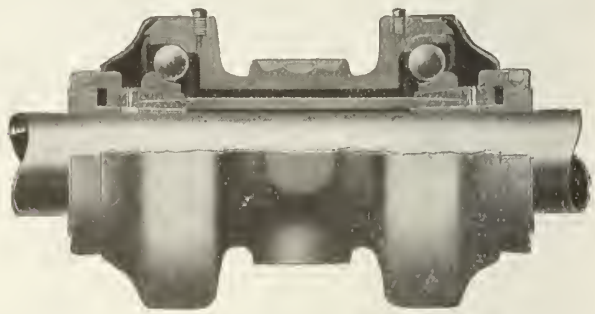


Fig. 4—Details of construction of Chapman bearing.

kind of plant they can be kept out of the present comparison.

If you were to ask the writer what are the reasons for the generally large belting expenditure in many plants as compared to some others in the same line of business, the general answer would be, "plain common ignorance of requirements, and lack of the proper treatment of the belting after it has been put into use." A belt, like any other contrivance, is just as strong as its weakest spot, and the weakest spot in a belt is apt to be where it has been joined after being cut to the proper length for the machine.

There are all kinds of belt fasteners on the market, from leather lacing to the old fashioned leather thongs. Wire lacing on a belt of sufficient thickness to bed the lacing below the surface of the belt so that it will not come in contact with the pulleys, and thus wear out, makes a smooth running joint and is moderately quick of application. Belt studs are objection-

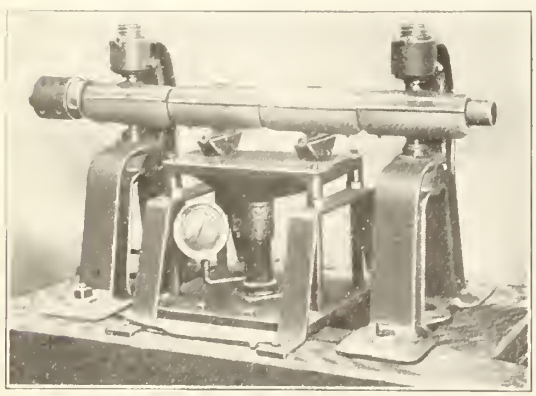


Fig. 5—Showing how the shaft and babbitted boxes were arranged to make tests. Note pressure gauge.

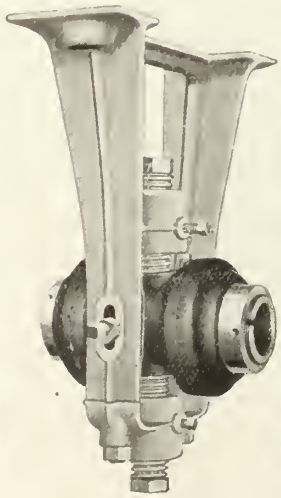


Fig. 6.

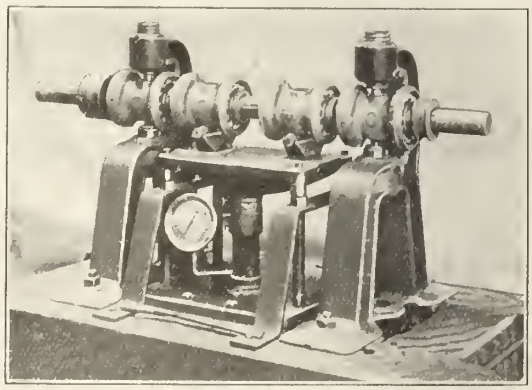


Fig. 7—Shaft arranged with Chapman double ball bearing boxes for making tests to compare with babbited boxes.

able, especially if run over small diameter pulleys, as they have a knack of tearing through the ends of the belt, particularly if it is an old belt. Speaking from experience, the writer holds to the opinion that a spliced belt is far and away the best and most economical method. It produces an absolutely smooth running and well balanced belt, which is the ideal aimed at.

It is the argument of the manufacturers of the various belt fasteners that if a belt breaks while your machine is running (and, of course, you are always in a great hurry and must keep up the output), presto, you fix your belt in a jiffy and off you go, as happy as a clam, loss of time practically nothing. Of course, there are times when this is perfectly true, but why should a belt break so suddenly. The answer would likely be that it already had anywhere from four to a dozen joints in it, and it would be surprising if it did not, after being run for years and the leather practically rotten.

Anticipating Life of Belt

A safe anticipation as to the life of a leather belt, put on with a view to the power required under the heaviest working conditions plus a good margin, would be at least ten years, though many factory men can point to belts running twice that length of time which are apparently in fine condition still. This would generally apply to belts running over large pulleys with the speed moderate. Spliced belting put on new, with the proper appliances, having the splice well planed, and taken up as it stretches, will be found to be the perfect endless belt. A good oak tanned belt can be stretched before it is placed on the machine, but it does not always stay stretched.

A personal experience was with a 6-inch belt about 30 feet long being stretched nearly a foot and kept that way for about a week. This belt was to take the place of a fibre belt that was nearly worn out, and then was the time to do the stretching, but when the stretcher was taken off the belt pulled back to its original length. It was spliced, put on fairly tight, and in less than a week the splice was opened up and the belt drawn up a few inches. In another short time the operation was repeated, and in a much longer interval a third "pull up" was required. The belt has been running smoothly without any further attention for several years, beyond putting on a little neat's foot or sweet oil to keep it soft and pliable.

Planing the Splice

The planing of the splice can be truly and evenly done by a well sharpened plane. After the splice has been made and the belt placed in a position to be run on, a piece of basswood board slightly wider than the belt and, say, three feet long, should be obtained. To this the ends of the belt, clear of the splice, can be held by short, flat-headed nails. The splice can then be glued with reasonably thick glue, the pieces laid together and covered with a piece of paper, and a warm caul, the duplicate in size of the first mentioned piece, laid over it and clamped there with hand screws. A good joint is thus assured.

A hide glue will make as good a cement for the purpose as anything, and while holding well, the splice can be opened with an ordinary screwdriver when any shortening becomes necessary. As a belt slackens, or rather lengthens gradually, the necessity for shortening becomes noticeable before any hasty treatment is needed, and it is fixed after quitting time, if it is a constantly running belt, so that there is no delay at all during working hours.

The makers of belting other than leather, are at present making decided efforts to introduce their product, and doubtless they will succeed to the extent that their goods really deserve.

There are drives in woodworking plants where a rubber belt may give as good satisfaction and wear, as a leather one. A rubber endless belt that has been spliced by the maker runs beautifully smooth and noiselessly, and if used on a constant power application, such as transmission from one line shaft to another, over good sized pulleys, it will be found satisfactory. Summing up an experience gained in many factories in the woodworking industry, the writer, while open to conviction, still pins his faith to the leather belting as being the most economical and serviceable. The generally dry atmosphere of furniture plants is not conducive to the long life of rubber, or any similar belting. It is easily proved that rubber deteriorates very fast. Witness how soon your footwear cracks up, even when laid away.

Rubber belting is composed of cotton strands which are bound together by the rubber composition, and when the vitality of the binding compound begins to weaken the natural results are in sight. There are, of course, preparations made to lengthen the life of rubber belting, and they are doubtless good. Rubber belts are primarily for use in and under conditions that are not suitable for leather belts, and so fulfil their object, but such conditions do not occur very frequently in the general run of woodworking plants.

The Rope Drive

Another method not so much in general use, of transmitting power is the rope drive, which is used only on main or sub main drives. Rope drives are of two types, the British and American. The former is a multiple rope consisting of as many independent parallel ropes as are necessary, running over grooved pulleys. This system has some points of advantage, the principal one being the almost absolute reliability of steady power, as the giving out of one or two ropes suddenly will not suspend operations during working hours for repairs, the ropes being spliced and put on after hours. This is a job for a man who knows how, and it can easily be understood that in a British factory there are always enough men of sailing experience who can splice a rope to perfection. This is another case of where it is always prudent to have a surplus of belt power, so that the breaking of a rope or two will not be harmful, the remaining ropes automatically taking care of the increased load for a time.

The American or continuous system depends on the one rope, which is laced back and forward over the pulleys, the tension on the rope being controlled by a pulley and weight which acts automatically. The weakness of this system is that if the rope breaks a stop for repairs is necessary, though the splicing can be done quite rapidly by an expert at the business. This rope drive system is more flexible than the British, as it can be taken and applied to almost inaccessible places. Anywhere that the rope can be taken power can be transmitted.

A combination of the two systems would be the best possible installation of rope drive. The ropes must not touch the bottoms of the grooves in the pulleys. The grooves being the shape of a parabola the rope is gripped firmly and is also readily released, which ensures the longest working period.

Repairing and Rebuilding Railroad Cars

Methods in Use at Grand Trunk Shops, Montreal—Equipment of a Modern Plant—Female Labor Being Used Extensively for Light Operations

Staff Article

The car shops of the Grand Trunk Railway at Point St. Charles, Montreal, are examples of woodworking plants driven partly by electricity and partly by steam power. At the present time the work carried out at these shops consists almost entirely of repairs, although in some instances this amounts to a practical rebuilding of passenger and freight cars. Electrical drive is gradually superseding steam at Point St. Charles, the advantages being, it is believed, in favor of the former method. For one thing, it is stated that electrical drive is more economical, as the power can be shut off when certain machines are not in operation —as is often the case in these shops. Also the use of electrical current permits complicated shafts and pulleys being abolished.

The shops are divided into two coach shops, one with accommodation for 12 cars and the other for 18 cars; freight shop, with seven tracks and accommodation for 75 cars; passenger mill and cabinet shop; freight mill, brass and tinsmith shops, upholstery department, kiln, paint department, varnishing room, and machine shop. The main building is 950 feet long, and contains the passenger shop and mill, freight mill, brass and tinsmith shops, and machine room. The freight shop is a separate building, 700 feet long, but is connected with the passenger shop. Tracks run through and across the main building, and turntables permit the various manufactured parts and raw material to be rapidly moved in small cars to different portions of the shops and mills. The upholstery department adjoints the kiln, and above the former is the drawing office.

Sill planer, freight mill, G.T R. shop.

Southern pine is chiefly used for the heavy work, and poplar, oak, mahogany, satinwood, and walnut are employed for the passenger cars. The sills are made of Southern pine, and oak is used for truck construction and the platforms, while mahogany, satinwood, and walnut veneers are employed for inside finish. The lumber for the freight cars is unloaded direct from the track into the mill; that for the passenger cars goes to the kiln, which consists of four sections, and is run on the dry-heat system. The dried lumber and the veneers are stored in a large room adjoining the kiln, which is situated close to the passenger mill. The kiln has a capacity of ten carloads of lumber.

The company are replacing some of the older machines with new ones, and, as these are installed, they are equipped with individual motors. All the large motors have starters, and these, together with the switches, are enclosed. With few exceptions, the motors are also enclosed in boxes, with a lid, so that they are very accessible. They are direct connected, and vary in size from 5 h.p. to 75 h.p. Power is supplied from the power house, adjacent to the mills. A group of eight boilers of 1,520 h.p. capacity supplies steam to operate the engine and heat the shops. There are three large engines of the compound condensing type, one of which drives a 300 kw. generator for direct current for both car and motive power shops. The wires are laid in conduits. A 1,500 cubic feet steam-driven air-compressor supplies compressed air to operate the air-driven tools throughout the shop.

The machinery in the passenger mill is placed on one side of the building, the cabinet work proper being mainly done on the other side, although there are a few benches on the machinery portion. The passenger mill is devoted to the lighter work, such as sashes, doors, veneering, frames, chairs, etc. Lately some new machinery, including a sander and a planer, supplied by the P. B. Yates Machine Company, Hamilton, Ont., has been installed. In the case of new equipment, the machines are set on foundations of solid concrete, with a pit entrance at one side, enabling the workmen to readily get at the machine in case of breakdown or repairs.

When a car job comes in, the foreman receives instructions and plans from the drawing office; then gives out the mill work required, and after this is machined it is passed over to the cabinet department. From there the work goes to the varnishing room, or maybe direct to the passenger shop, where the car is completed. Some of the jobs are of minor importance, but others mean a partial rebuilding of the car. All the painting is done in the shops, both on passenger and freight cars. In the passenger mill the machinery includes Greenlee sticker, mortising machine, and rip and crosscut saws, F. B. Hayes tenoner, Jackson & Cochrane boring machine, Fay & Egan stickers, McKenzie & Bertram vertical borer, Berry & Orton buzz planers; also shapers, jig and rip saws, and band saws. A portion of these are steam-driven, but there is a Canadian Fairbanks-Morse motor, with switches by the Lancashire Dynamo and Motor Company, and also two Canadian Crocker-Wheeler motors, each of 5 h.p., 550 v., 60 cycle, 3 phase, 900 r.p.m.

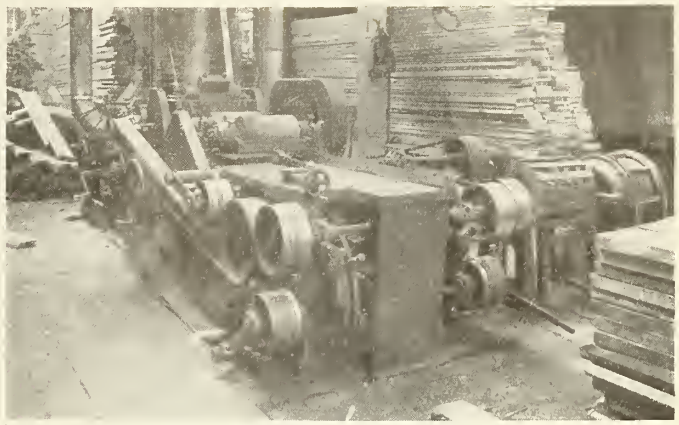
The freight mill is very much larger than the passenger mill, which it adjoins. Here the heavy work is done, including sills, posts, and roofs. The work is practically all, at the present time, of the stock order, the various parts being made in readiness for all jobs. This entails carrying a great variety of parts, as the design of the cars vary very considerably, some of them having been in service for many years. Sometimes the stock parts are not of the right dimensions; when this occurs, the workman from the shop marks the necessary alterations on the parts; these are then carried

out at once and the lumber conveyed to the shop. Many of the machines are electrically driven, those so driven being grouped together in one section of the mill. The following are the machines with the motors that drive them: Berlin matcher, with a capacity of up to 250 lineal feet per minute, Canadian General Electric 50 h.p. motor, with 1½ h.p. motor, for grinding knives; Fay & Egan planer, Packard Electric Company 75 h.p. motor, 1,200 r.p.m.; rip saw, Canadian Westinghouse Company 5 h.p. motor; three crosscut saws, Canadian General Electric 5 h.p. motors; Greenlee machine, Packard Electric Company 20 h.p. motor, 900 r.p.m.; Greenlee tenoner, Packard Electric Company 15 h.p. motor; S. A. Woods five-spindle borer, Canadian Westinghouse 15 h.p. motor, with a counter-shaft to operate the two large angle borers; Berlin sticker, Canadian General Electric 30 h.p. motor.

The other machines are operated by steam power. They include Fay & Egan rip saws, stickers, three-spindle borers, tenoners, and hollow-chisel mortiser, S. A. Woods planer, McKenzie & Bertram sizer, Atlantic Works (Philadelphia) band saw, Bental, Margedant & Co.'s buzz planer. There are several other machines, some manufactured in the mill for the purpose of the company. A tie plug machine turns out 30 plugs at every operation—25,000 per day—these being made from scrap wood. A rail brace machine has a capacity of 800 per day, the rail brace being turned out complete in every operation.

The saw sharpening room is equipped with grinding machines and also machines for punching teeth. Saws by Simonds Canada Saw Company and by Henry Disston & Sons are used.

Practically all the painting is by brush, the only spraying being done on the freight cars. The company have a very large paint store, in which all the paint is mixed and stored; the company also make their own putty. In the varnish room the doors and all other fittings are varnished and left to dry for several days.

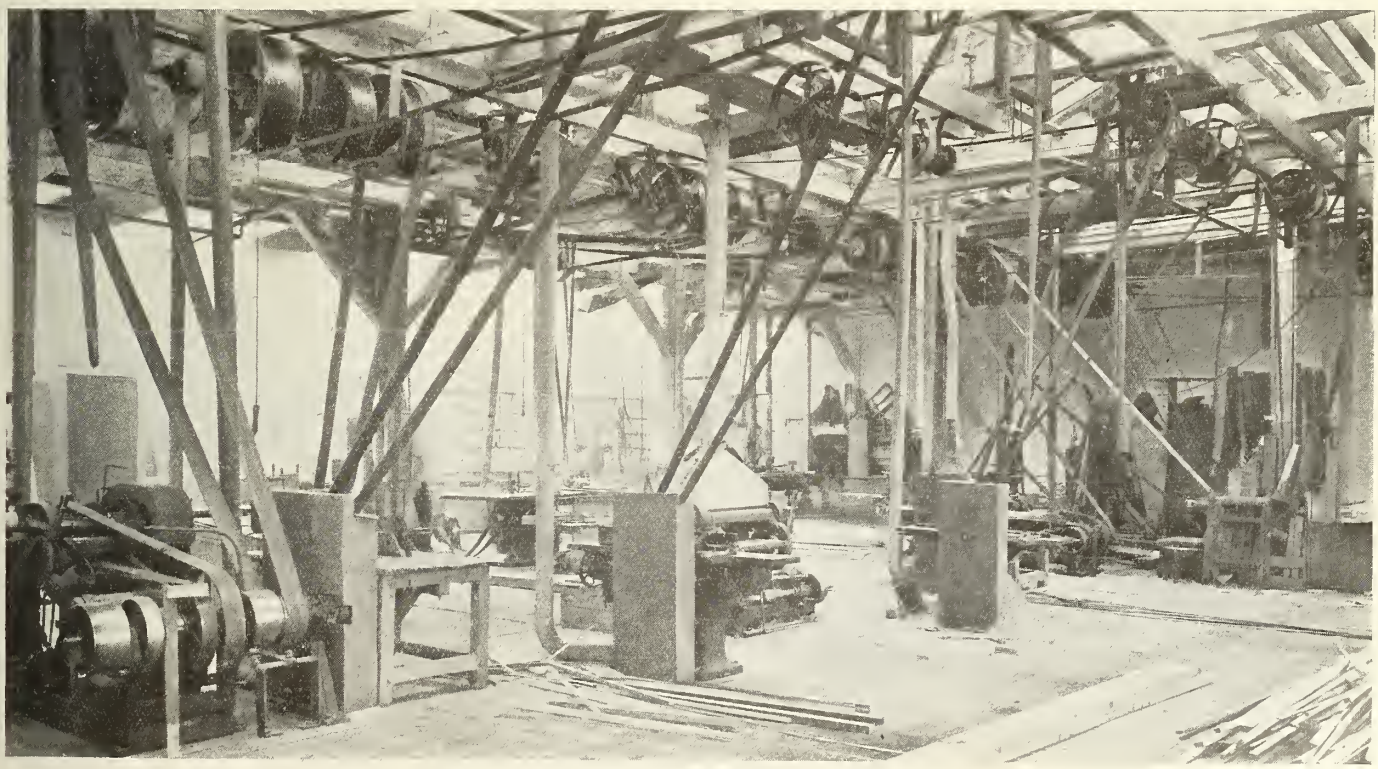


Matcher, freight mill, G.T.R. shops.

The upholstery department cleans the seats, and makes the blinds for windows, the mattresses, etc.

Female labor is now employed in the passenger car paint shop and also for washing down interior of passenger cars and car sashes and fittings in the washroom. The women are engaged on staining, filling, varnishing, and rubbing down deck sash, window stops, face mouldings, dining car chairs, tables, and various small work done in the varnishing room. Another department is painting the inside of baggage cars and painting and bronzing fixtures and steam pipes inside passenger cars, in addition to rubbing down and polishing inside of the passenger cars. All work is done on the piece system to a standard schedule of prices. The standard uniform overall suit consists of a cap, and jacket coat with belt around the waist, and pantaloon overalls laced at the ankles.

Mr. J. Coleman is the superintendent of the car department, and Mr. John Hendry master car builder. We are indebted to these gentlemen for the information in this article.



Cabinet or passenger mill, Grand Trunk shops, Montreal.

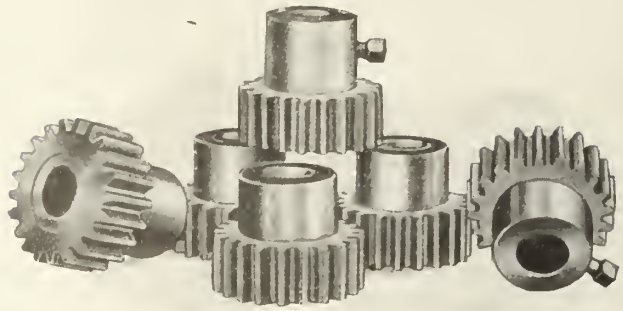
Fire-Brick and Fibre Gears

The two cuts shown herewith illustrate two of the lines handled by the Beveridge Paper Company, Limited, of Montreal. One of these is fibre gears. These are the product of the Diamond State Fibre Company of Elsmere, Del., U.S.A., for which the Beveridge Paper Company have the Canadian agency. The Diamond State Fibre Company state that they have invented a special gelatinizing process which makes a dense fibre of relatively high specific gravity and that their product is entirely different from the ordinary vulcanized fibre. This fibre is made particularly for gearing and is hard and durable and gives good service in use. The chief advantage claimed for fibre gearing is that they are perfectly noiseless in operation. Besides gears the company manufacture numerous

Jointless fire-brick for lining furnaces.

other products from fibre, including boxes, pails and containers of different kinds, and also casters.

The jointless plibrico fire-brick shown in the illustration is for lining furnaces. It consists of certain refractories scientifically compounded to eliminate expansion and contraction. It forms a jointless monolithic structure, including front and side walls, door arches, rear arch and bridge wall, that fits up tight round the boiler shell or tube headers. It is said for this jointless lining that it does not crack, loosen, bulge or spall off, and it lasts much longer than a lining of separate fire-brick. Plibrico jointless fire-brick comes in a stiff plastic condition and is pounded into place with a mallet, and smoothed with a trowel. The makers state that door arches and rear arches can be formed by an intelligent workman without special tools or skill.

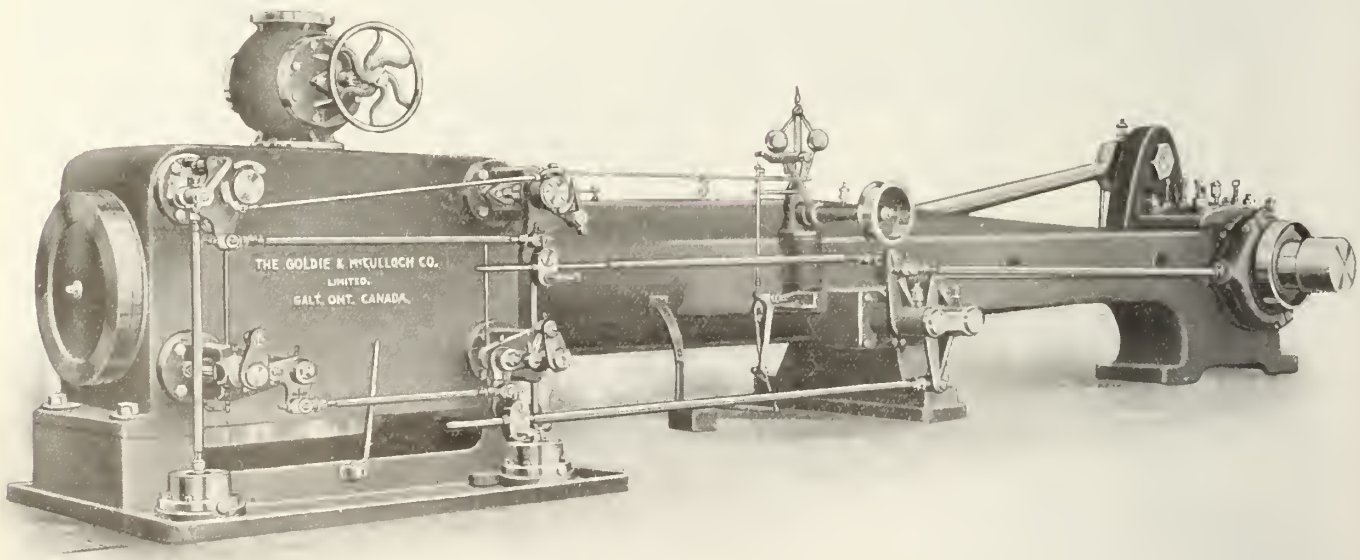


Fibre gears with metal hubs.

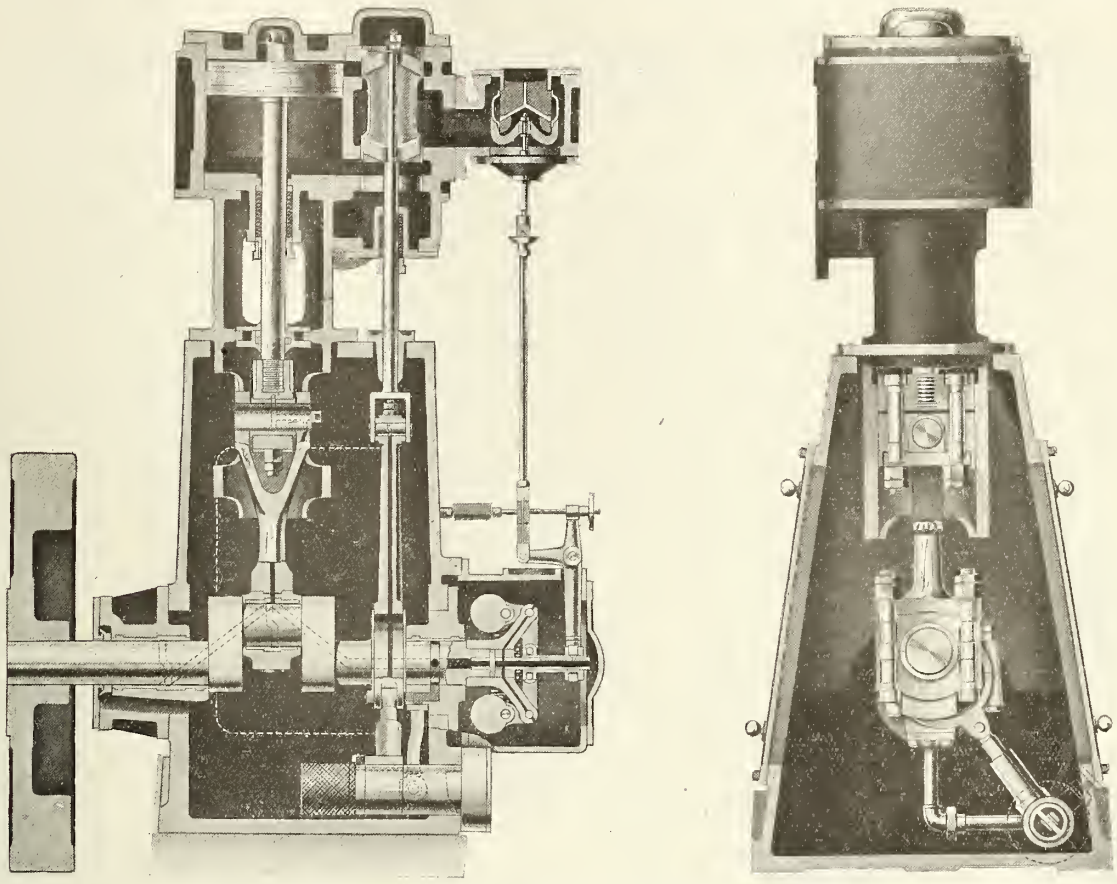
Besides the two lines illustrated, The Beveridge Paper Company handle various others, such as papers, bags and paper goods, waterproof paper, reinforced with twine, waterproof paper for export and domestic case lining, parcel post and car lining, etc. They also handle the Protecto boiler preservatives for cleaning boiler plates and tubes of scale. The makers of Protecto claim that it forms a protective enamel to which further scale will not adhere; also that it prevents cracking and seals present cracks. Further particulars regarding any of these products can be secured by addressing the Beveridge Paper Company, Limited, at 17, 19, 20 St. Therese Street, Montreal.

Goldie Corliss Engines

Steam engines have not as yet been entirely displaced in favor of electric drive. There are still many plants where the steam engine is preferred. If proper attention is given the boilers which produce the steam and the engine is given the attention it deserves, it will prove a long and faithful servant. One of the most



Single cylinder girder frame Goldie Corliss engine.



Front and end sectional views of the Goldie & McCulloch Company's vertical engine.

popular engines in Canadian factories is the Goldie Corliss, made by the Goldie & McCulloch Company, Ltd., of Galt, Ont. Our illustration shows this engine. The following information regarding engines, given by the Goldie & McCulloch Company, Ltd., should be of interest to our readers:

Compound Engines

"It is generally recognized that compound engines are much more economical than simple or single cylinder engines, consequently their sales are increasing, particularly for large powers. It is well known that expansion can only be economically carried out in a single cylinder to a limited extent, as the condensation and consequent re-evaporation will, by robbing the cylinder of heat, more than do away with the gain from increased expansion. To carry out the principle of expansion to a greater extent than can economically be done in a single cylinder has been the aim in constructing the compound engine. In the compound engine the great extremes of temperature are divided between two or more cylinders, thus permitting expansion to be carried out to a much greater extent than is possible in a single cylinder engine, and thereby effecting a great saving of fuel.

"The cost for a given power of a compound engine, of course, exceeds that for a simple engine. This is partly balanced by a saving in boiler capacity, and is ultimately more than compensated for by the saving in fuel. There are different arrangements in compounding, one being to place essentially two engines side by side and connect one on each end of the shaft, the cranks being set at right angles. Another way is to place the cylinders in line, having one piston rod common to both. This system takes up less room and requires a short steam pipe to connect the cylinders.

Condensing Engines

"We do not always recommend the use of a condenser. Local situations vary, and these will determine whether a simple engine or condensing engine will be the more profitable. If the establishment be of such a nature that all, or nearly all, of the exhaust steam can be advantageously and profitably used, we would not advise the use of a condenser. Many industries, in addition to using all the exhaust steam, make demands on the boilers for live steam. But where the above conditions do not exist and when a sufficient quantity of water is obtainable at a reasonable cost, we recommend the use of a condenser. This should effect a saving in fuel from 20 to 25 per cent., as well as add to the power of the engine.

The Goldie & McCulloch Company have recently placed on the market a type of vertical engine. This engine is illustrated herewith. It is of the marine type, adapted to land conditions, without the complication of reversing gear, etc. The lubricating system is on the forced feed principle. Every bearing and pin, even to the governor pins, is fed by oil under a pressure of 15 to 20 pounds per square inch, the oil being out of reach of contamination by dust or dirt. Forced lubrication is said to practically annihilate wear, and engines fitted with it can run for long periods without the bearing requiring attention.

The Lumber Market

Domestic Woods

There is practically no change in local conditions respecting the lumber market. Wholesale lumbermen interviewed report that they have great difficulty in handling their correspondence owing to the insistent demand from manufacturers. Even when they have the stock and want to fill the orders, they find difficulty in getting their material moved by the railways. The car shortage is pronounced, and has added a disagreeable feature to an already serious condition.

A great many factories throughout Canada are still working on shell boxes, and, as a consequence, the demand for lumber is very strong. Furniture factories continue busy, particularly those manufacturing summer furniture. The season for this commodity is just approaching, and retail furniture men say they expect a busy season.

In our last issue we stated that the Imperial Munitions Board were considering the adoption of a hardwood Bethlehem shell box. This seems to have been dropped for two reasons—first, that a hardwood box would be heavier; and, second, one manufacturer with whom the Munitions Board took the matter up was afraid to tackle them, as he feared the hardwood would check later on, and that he would be compelled to make them good. This will help to some extent to conserve the existing stocks of hardwood, and they need to be conserved, according to best reports.

Existing prices at Toronto for the leading hardwoods on car lots are as follows: White ash, firsts and seconds, 1½ and 2 in., $60; birch, firsts and seconds, inch, $44; basswood, firsts and seconds, inch, $48; soft elm, firsts and seconds, inch, $40; rock elm, firsts and seconds, 1½ and 2 in., $55; soft maple, firsts and seconds, inch, $33; hard maple, firsts and seconds, inch, $40; Douglas fir, No. 1 and 2, 1 in., clear, $44.50.

Imported Woods

The difficulty of securing logs is interfering with the production of hardwoods in the Southern United States. The first difficulty experienced was the flooding of all low-lying lands through the Mississippi River and its tributaries overflowing. Just when these conditions are showing some improvement the sawmills find that they are held up by the lack of transportation facilities.

There has been no falling off in the demand for lumber in the United States, despite the fact that the country is now at war. A certain amount of panic might have been expected which would have had a tendency to make people economize in the matter of building and purchasing furniture. Instead of this, the demand is practically the same. This, together with the shortage of stocks and lack of cars to ship in, has held prices up. In fact, the prices on some items have shown an advance during the past month.

The conditions are worse in regard to the Southern hardwoods than the Northern. This is due principally to the flooding in the South, which prevented the mills operating. In the Northern States the difficulties that had to be contended with were the shortage of labor and lack of cars.

Cottonwood, gum, and oak, in all grades, are in great demand, and dry stocks are conspicuous by their absence. It is expected that the United States Government will require immense quantities of oak for their war preparations and that these requirements will be stated in a few days. This is almost bound to send oak prices soaring in view of the decreased production.

Of the Northern woods, beech, birch, and maple are probably the most frequently called for, though all woods are in strong demand. In the East stocks of dry poplar and chestnut are not very large, and if cars were obtainable would not be large enough to meet the demand.

There is a strong demand from box manufacturers for low-grade stock, due to the general prosperity of the country creating a big demand for containers. Some of the representative quotations on hardwoods are: 4/4 basswood, firsts and seconds, $52.50; No. 1, $42.50; No. 2, $32.50; No. 3, $26.50; 5/4 firsts and seconds, $54.50; No. 1, $44.50; No. 2, $34.50; No. 3, $28.50; 4/4 birch, firsts and seconds, $54; No. 1, $39; No. 2, $29; No. 3, $20; Firsts and seconds, 5/4, $57; 6/4, $61; 8/4, $66; No. 1 common, 5/4, $47; 6/4, $51, and 8/4, $56; 8/4 maple, firsts and seconds, $66; No. 1, $56; No. 2, $46, and No. 3, $20; soft elm, 4/4, firsts and seconds, $45; No. 1, $35; No. 2, $25; No. 3, $21. These are very strong quotations, and, while they may not be representative of sales made at present, they represent quotations that Northern millmen hold for. Hardwood flooring and veneers are very strong in both demand and price.

A Fine Shipment of Birch Plank

Birch planks from Quebec.

An interesting shipment of birch planks was recently made by Edward Clark & Sons, Toronto, to the United States, for use in the production of automobile trucks for the United States army. The shipment consisted of a car of 12,000 feet of No. 1 common and better 5-inch birch, which averaged 12½ inches in width and graded 80 per cent. first and seconds. This car contained a few pieces of stock 5 inches thick by 32 inches wide by 14 feet long, which did not show a single spot on either side of the plank. The stock came from the Province of Quebec. The illustration gives some idea of the size and quality of this stock.

Every boiler should be provided with two safety valves. The size of the opening into the boiler depends upon its steam-producing qualities, the object to be attained being to reduce the pressure within the boiler to its safety point as quickly as possible.

When water is pumped into the boiler or allowed to run in, some opening must be given for the escape of the contained air. Usually the most convenient way is to open the upper gauge cock after the fire has been lighted until cloudy steam begins to escape.

Fires should not be lighted under newly-set boilers for about two weeks, if it is at all possible to wait that long.

Upholstering and Trimming

Estimating the Amount of Material Required

One of the first requisites in making loose covers at a profit is to be able properly to estimate the quantity of goods required and the value of the time necessary to make them. For the average chair, where the extreme width of the chair is less than the width of the fabric, few measurements are needed, either for estimating or making.

By placing one end of the tape line at the bottom of the chair, A, Fig. 1, and stretching it to B, then from B to C, from C to D, from D to E, and from E to F, adding an inch at every point for seams, we find the quantity that would be required to cover such a chair as Fig. 5, with the exception of the sides. These are calculated by measuring from the floor to the top of the seat or arm, H to G, doubling this quantity, and adding it to that required from A, B, C, etc., to F, will give approximately the quantity required to make the slip-cover.

In planning the covers it is better to have the furniture convenient to the workroom, but as customers frequently require that the covers be fitted in the house, this is not always possible, and necessitates extra fitting, which must be covered in the estimates.

To cover the chair illustrated in Fig. 2 the material is laid over the chair in the same manner as illustrated by the tape-line for taking the measurements. Starting with the end of the material at A, it is carried across the top of the chair at B C, down the back to D, and, on stuff-over furniture like Figs. 3, 4, 7, and 8, about eight inches extra is allowed at D as a tuck-away. Note illustration Fig. 2a. For pieces similar to 5, 6, and 9, an ordinary seam allowance is all that will be necessary at this point. The goods are then drawn over to E and down to the floor at F.

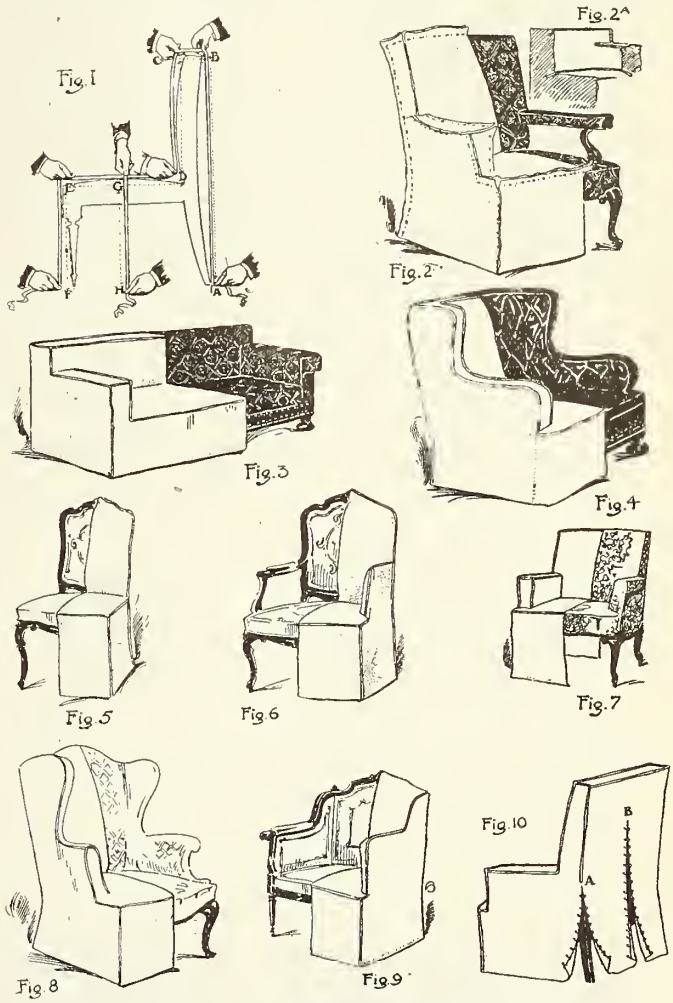
Make a pleat at B sufficient for seams, and likewise at C, D, and E. The goods are then carefully pinned to the chair sufficiently to prevent it drawing out of shape, and all fullness carefully smoothed to the edges where the seams are to be made. The goods should be carefully squared and smoothed into position before cutting at any of the angles B, C, D, or E. After these pleats have been split and carefully pinned, as Fig. 2, the surplus is trimmed away.

This method of laying the goods over the chair in one continuous length can only be followed where the material is plain or has an indefinite reversible pattern. Large floral designs must be planned so that the pattern always runs towards the top.

The side covering, which is cut separately, is also pinned into position, and the seam allowances at the corners, as well as the angles B, C, and E, are carefully trimmed to the desired size, stitched, and bound with rope or braid.

The edges at D are pinned, so that they may be sewn from the wrong side, and do not require binding. The bottom at A, H, and F is turned to a hem about half an inch wide. The cover may be planned to fasten together with hooks and eyes at the back corners, as A, Fig. 10, or in the centre, as B, allowance in either case being made for an overlap of about two inches. For a chair having a back that is wider at the top than at the bottom, the opening should be in the middle of the back at B; for all the others it may be left on both sides at A. On round edges, like the top of Fig. 8, it is necessary to dispose of the surplus by taking small pleats in the seam. Pleats that are over two inches in length should be stitched down to keep them in position, and if bulky the surplus must be cut away.

After the material has all been carefully pinned in position, it is removed from the chair, and the seams bound with braids or tapes. The tuck-away at D and



Measuring for covers for stuff-over chairs

below the arm of stuff-over pieces (see Fig. 2a) may be either sewn together or left separate, and is tucked in between the upholstering when the cover is in place.

It is customary in tight upholstered pieces, as 5, 6, and 9, to bring the back and front edges together, without the boxing represented by B and C in Fig. 1, but, in all cases where the upholstering is sufficiently thick, the boxing should be used, as it tends to keep the cover in better shape. The matter of making slip-covers, while not difficult, requires considerable care and patience in fitting, in order that the finished cover

may fit without drawing or wrinkling at any point. To estimate for large pieces which require more than one breadth to cover the seat, as Fig. 3, it is only necessary to calculate the extra number of breadths that are required, and estimate accordingly. In estimating the side pieces of Figs. 4, 8, and 9, the measurement is taken from the floor to the topmost point of the side, with seam allowance added.—The Cabinet Maker.

Cost System for Upholsterers

One of the most difficult branches of the furniture industry to devise a uniform system of cost accounting for is the manufacture of upholstered furniture. The reason is that no two manufacturers' products are exactly alike. There are so many grades of material entering into the manufacture of upholstered furniture that it is practically impossible to draw up a schedule that manufacturers could be guided by in fixing their selling price. Therefore, the following table, which has been decided upon by the upholstery section of the Furniture Manufacturers' Association as a basis to work from should be of interest.

In giving out this system the secretary of the association says: "Of course, manufacturers have their own methods of figuring cost, and they are not asked to change them, but they are asked to prove their figures by the method below, and if their cost system does not make selling price as great as the method herein recommended they are advised to raise their selling price to what it would be if figured by this method."

All materials at prevailing prices	$
All direct and producer's labor	
Seventy-five per cent. on direct labor to cover factory overhead	
Total factory cost	$
Forty per cent. on total factory cost, to cover administration, selling cost, and profit	
Selling price	$

To illustrate in actual figures:

All materials at prevailing prices	$4.00
All direct and producer's labor	3.00
Seventy-five per cent. on direct labor to cover factory overhead	2.25
Total factory cost	$9.25
Forty per cent. on total factory cost of $9.25 to cover administration, cost of selling, and profit	3.70
Selling price	$12.95

The secretary of the Furniture Manufacturers' Association says that this method has the advantage of taking care of the rise in prices of materials and productive labor, and that manufacturers are recommended to constantly check their selling prices in this way. This is very important under present conditions, as prices of raw materials are constantly advancing.

Materials should always be reckoned at prevailing prices. The manufacturer must protect himself when prices go up, because when prices drop he is compelled by competition to reduce his selling prices. A full list of everything that enters into the manufacture of upholstered furniture should be kept alphabetically arranged and the quantity and cost of each should be checked off for every fresh batch as it is put through. Otherwise something will be missed or underestimated.

Fabrics for Furniture

Twenty miles north of the Vimy Ridge, captured by the British armies recently, is Lille. This town and its surroundings, in pre-war days, supplied the British furniture trade with a good proportion of the tapestries used for hangings and upholstery, says the Cabinet Maker, of London, England. Now, when it is reasonable to suppose that this district will soon be once more in the hands of the French, it is natural to ask what immediate effect its capture will have on the supply of furnishing fabrics. So many wonderful feats of organization have been accomplished during the war that it is rash to prophesy, but those best qualified to judge hold the view that it will be quite two years before the manufacturing district of which we are speaking will again be in a position to supply the needs of the furnishing trade.

War correspondents have already given us vivid descriptions of the destruction which has been wreaked on villages and towns by the retiring German army. It cannot be doubted that this is part of a deliberate policy, and that if the Germans are forced to give up the manufacturing districts of Northern France they will destroy, so far as they are able, every stick and stone which may be of the least economic use to the French. It is highly probable that the looms in Lille and the surrounding districts were rendered useless long ago on account of the shortage of brass, copper, and leather in enemy countries. It is also reasonable to suppose that leather belting has been commandeered wherever it has been found.

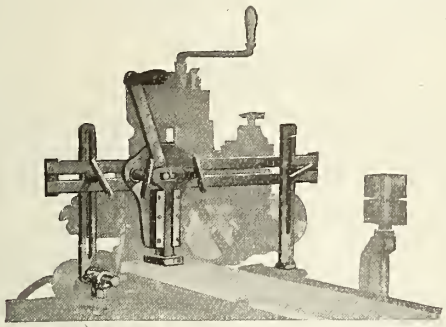
What we have written above with regard to the weaving industry of Lille is, of course, equally true of the tapestry-weaving districts of Belgium, and we see no probability of immediate supplies from either of these sources. In 1915 and 1916 buyers in this country sought for supplies of tapestry, suitable for the furnishing trade, in Italy, and considerable quantities were bought. Some of these goods were quite suitable, as regards design, for this market; though it must be confessed, in connection with other Italian tapestries, that their design and color would have prevented their sale here but for the fact that there was scarcely anything else available at the moment. Just now, when the Italian manufacturers have begun to understand the class of goods needed for the British trade, transport difficulties have arisen, and supplies from Italy are, in consequence, much restricted. At a rough estimate, about 50 per cent. only of furnishing textiles ordered in Italy are coming through.

Towards the end of 1914 a conference was held between the National Federation of Furniture Manufacturers and representatives of textile manufacturing concerns. At that meeting it was suggested by large upholsterers, in some instances somewhat acrimoniously, that the makers of British furnishing textiles were not doing all that might be done to supply the goods which had previously been obtained from abroad. We pointed out at the time the nature of the problem which the textile people were called upon to tackle. Some of the furnishing men appeared to think that a new range of furnishing fabrics could be woven with the ease and speed with which a run of hall-stands or coal-boxes are put in hand in a machine factory. As a matter of fact, there is absolutely no comparison between the two trades. To alter and adapt a number of looms engaged on one class of fabric in order to make them suitable for weaving another kind of cloth may mean an outlay of anything from five to ten thousand pounds.

"Safety First" Department

Tenoner Hold-down and Guard

The accompanying illustration shows a tenoner hold-down and guard, manufactured by the Gustafson & Scott Manufacturing Company, of Chicago, which is claimed to absolutely eliminate any chance of the work getting away from the operator to injure him or the machine. Another feature of it, as pointed out by the makers, is that it can be operated by a man who has lost his fingers or who has merely a stub arm with a hook. The appliance can be attached easily and quickly to any make of tenoner without boring, tapping, or altering either in any way. As a hold-down it



Is claimed to protect operator and machine.

is said to work so effectively that stock which is not perfectly straight will come from the machine straight.

The Gustafson & Scott Manufacturing Company also manufacture a line of machine guards for jointers, shapers, circular saws, and emery wheels. The jointer guard is of a type approved by the various safety associations. The aluminum shield, which is attached to the machine by means of a spring, automatically covers the portion of the knives not in use. The shield opens just far enough to admit work of varying dimensions to pass through. The operator can draw the work back across the guard without danger of getting his fingers in the knives. Thin stock can be passed under the shield, which can be raised or lowered slightly.

The shaper guard is a circular shape, and fits over the head containing the knives. It acts as a spring to hold down the work while protecting the hands of the operator.

The company manufacture several types of saw guards to suit different conditions. The emery wheel guard is a steel hood, with a cast steel bracket to hold it. A slotted hole in the bracket enables the hood to be adjusted as the wheels wear. Full information can be obtained about these guards by writing the company at 4315-25 Wabansia Avenue, Chicago, Ill.

Guarding the Moving Parts

The two illustrations shown here give an idea of what has been done in a large furniture factory to guard the moving parts of all machines. Fig. 1 shows how the pulleys and countershaft of a sticker have been taken care of. In Fig. 2 is shown the back end of a planer which has had a fence built around it to keep the off-bearer from getting mixed up in the belts. It will be noticed that a shelf has been arranged on top of the piping. This is a very useful feature, especially when small stock is being planed.

Any machine which requires an off-bearer should have all exposed pulleys and gears at the back of the machine covered. There is probably no person in the plant more liable to get caught in a machine than the off-bearer if he is working in close proximity to pulleys, gears, etc. Standing in practically one position for hours at a time is a wearying job, and the off-bearer, if he gets an opportunity, is liable to snatch a "lean" up against the machine, ignoring the fact that his apron or overalls may be flapping against a pulley or some uncovered gears.

The guards shown in these illustrations are not very costly to make. There is usually a collection of old piping around a woodworking plant that can be used for this purpose. Besides serving their purpose as safety-guards they give a machine room a very neat appearance.—A. Allen.

The velocity of steam escaping under pressure is known to be very great, though few are aware that even under a moderate pressure of, say, twenty or thirty pounds to the square inch, it is equal to that of a projectile fired from a cannon.

A notable example of the high velocity of escaping steam is that of a steam whistle, in which a jet of steam, little thicker than ordinary writing paper, produces a sound that can be heard further than the loudest thunder.

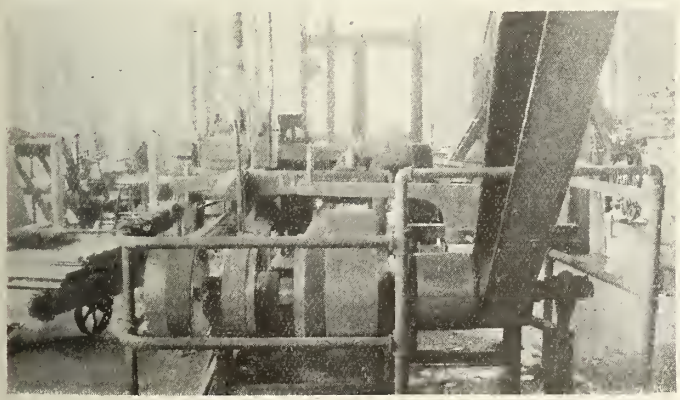


Fig. 1—Guard for counter-shaft.

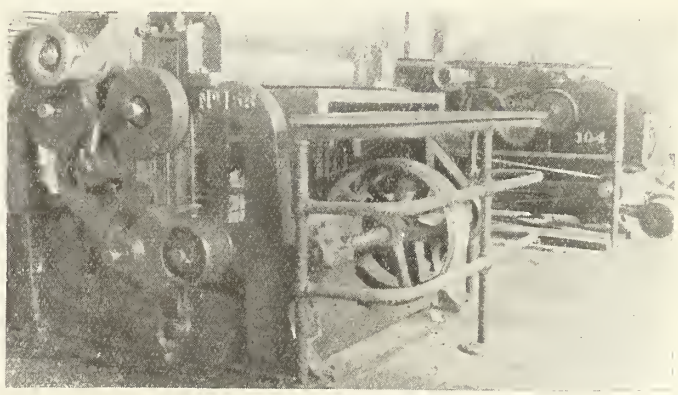


Fig. 2—Railing for back of planer.

The Process of Water Gilding

By Chas. W. Inglis

Water gilding is an entirely different process from oil gilding, as described in the March issue of the "Canadian Woodworker and Furniture Manufacturer." Instead of working on parts that are finished, it must be worked from the wood. This work is generally done on picture frames and mirror frames and particular parts of furniture. Water size is always used for burnish gilding, as oil size does not dry hard enough to permit of burnishing.

Parchment size for water gilding is made from parchment cuttings or cuttings from white gloves. Put as many of these in a clean stone pipkin as there are room for, cover them with water, and let simmer for two hours. To test if it is boiled enough, the palm of the hand should be wetted with the size and the other hand pressed closely against it several times. If it is sticky, the size may be poured off into a clean basin to cool for use. This size is most important to the gilder, as he uses it to mix nearly all his preparations. When the size is cool it is like jelly. The stronger it is the firmer it will be. The size at the bottom and top of the basin will not be as pure and transparent as that at the middle. The gilder should always be particular to mix his burnish and matt with the finest and clearest size, while the rest is used to mix whitening, stopping, thick white, etc.

Stopping is made by mixing size and whitening to the consistency of putty. It is used for stopping up holes or other defects in the wood. Thick white is a mixture of whitening and parchment size the consistency of cream. It is put on the parts to be burnished before the burnish size is applied. Burnish gold size is made as follows: Grind separately in water one pound Armenian bole, two ounces of red lead, and a sufficient quantity of black lead. Mix and regrind with a small quantity of olive oil. Reduce with parchment size to proper consistency.

After smoothing and dusting the work, give it a thin coat of boiling hot parchment size. When this is dry it should receive a priming coat of thin white, applied very hot, and composed of parchment size and white. When dry, the holes and defects are filled up with stopping. Then thick white is laid on evenly with a brush. After three coats, each one being dry before the next is applied, the work should be covered with a layer of hard whitening about a sixteenth of an inch thick. The last coat of white should not be as hot as the first ones.

To smooth out the work, use lump pumice stone, shaped to fit the beads, hollows, flats, etc., rubbing down all rough projections, and also taking care to square up all the angles. The work is now ready for the gold, the manipulation of which has been described for oil gilding.

The surface should first be wet sufficiently for the gold to adhere. Then lay the gold in the manner previously explained. Be sure that the part to which it is applied is sufficiently wet. It must be almost floating or the gold will be apt to crack. Where possible the work should be inclined, to allow the surplus water to run off. Do not attempt to cover much at a time until you are experienced enough to handle the gold with freedom. Should there be any defects, they should be quickly made good by applying more gold to the spot.

Burnishing

When the work is covered with gold, set it to dry. This requires anywhere from two to ten hours, depending on the warmth of the room. When it is ready, the parts intended to be burnished must be dusted with a soft brush. Then, wiping the burnisher with a soft wash leather quite dry, begin to burnish about an inch or two at a time, taking care not to bear too hard, but with a gentle and quick motion. Apply the tool until all the parts of the surface are equally bright. The burnisher is a tool made of either agate or flint, with a handle about six inches long. They are of different forms and sizes, but usually they are curved near the end.

Matting or Dead Gold

Certain portions only of the work are burnished, according to fancy and the facility with which the burnishing tool can be used. The remaining parts are deprived of their metallic lustre in order to make a more effective contrast with the burnished portions. The portions thus treated are said to be matted or dead gold. The process is as follows: Grind some vermillion or yellow ochre very fine and mix a very small portion, either with the parchment size or the white of an egg. Then, with a very soft brush, lay it evenly on the parts to be dulled. If well done it will add greatly to the beauty of the work. Previous to matting, the work must be cleared of all superfluous gold with a soft brush.

In elaborate work it is frequently impossible to lay gold leaf into all the little corners. The parts thus left bare must be finished by touching them with a small brush. The matt portions should then receive two thin coats of parchment size to finish the work.

Filling and Finishing Birch

By A. Ashmun Kelly

Birch, being a close-grained wood, will require shellac filling, white for the light wood and orange for the dark. While one pound of shellac to one gallon of spirits may be used all right, some finishers use as much as five pounds of shellac, but this is easily regulated, if too heavy, by thinning with alcohol. The addition of a little glycerine always makes shellac more flexible and easier to spread.

Not a few experts declare that birch is ruined by staining it, and no doubt this is true, but then it is not, as a rule, stained to enhance its natural beauty, but to

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make use of it as a substitute for other and rarer or costlier woods; for birch may be made to look very like mahogany, also golden oak, green oak, and rich chocolate brown. The natural finish of birch is very beautiful, either the red or white variety, and most particularly the curly variety. The finish should be natural, if possible, and well varnished and rubbed to a finish; but it is oftener stained, imitating walnut, cherry, or mahogany. A birch door, stained mahogany, in connection with white woodwork, is preferred by some to the real mahogany, especially where curly birch is used.

Some finishers think a paste filler an advantage on birch when stain is to be applied, arguing that the filler minimizes the effect of the stain in raising the fuzz of the wood. But whether paste or shellac, sandpaper well twenty-four hours after application, and apply a coat of primer, tinted to the required shade with a lake color. In another twenty-four hours sandpaper the second time, following with a flowed coat of the best pale cabinet polishing varnish; flow on a full coat. Finish by polishing.

Generally there are three finishes—golden, golden-red, and dark red. For the gold finish use raw and burnt sienna and a touch of lemon yellow. These pigments are to be mixed with the surfacer or first-coater; follow with a second coat of primer or thick varnish; finish with polishing varnish, one coat, and follow with polishing in the usual way. Finer effects may be had by the use of lake color, red and yellow. These will show the same color tone as the first-named pigments, but will differ in being transparent, leaving none of those tiny flakes of color seen after using the more opaque pigments.

The light-red finish may be obtained by using burnt sienna, the dark red from burnt sienna and vandyke brown. Being made very thin with turpentine, these colors are also sometimes applied as stains. In some cases the pigments are combined with the first-coater. The latter way is probably the best method; but, as in the former case, it is better to use transparent colors, such as the lakes offer.

To stain dark birch mahogany color, first apply a weak solution of bichromate of potash. This is left to dry; then make up a stain as follows: Mix together, in such proportions as will give the desired effect, rose-pink, vandyke brown, and burnt sienna; mix with turpentine. Apply this stain and let it dry; follow with fine sandpaper; then apply a thin coat of shellac, adding to it a little Bismarck brown to give the surface a more uniform color. The last coat of varnish may be rubbed with 0 or 00 powdered pumicestone and oil, not water.

Oil stains are not advised with birch, as they are liable to obscure the grain of the wood, also cause the rose lake to fade out. Water stain is to be preferred, as the water takes the stain deeper into the wood, and the stain does not rub through as easily as oil stain does. Still, many finishers prefer oil stain, using burnt sienna, burnt umber, and rose lake.

After staining the work, rub lightly with fine sandpaper and apply two coats of thin white shellac, rubbing the shellac also. Then apply two coats of varnish, finishing with fine pumice powder, and oil to a dull polish. The first of the two coats of varnish may be rubbed out with curled hair, using it in the form of a wad. This is better than sandpaper, for it will not cut the varnish around corners, etc. The advantage of the shellac consists in the fact that it bears up the varnish coats better, which sink more or less into the wood if applied without shellac.

Birch is regarded as a somewhat difficult wood to stain, not as regards the mere operation of applying the stain, but from the fact that the nature of the wood acts against the stain, some chemical action taking place, owing to a peculiar sap that it contains. The effect may not occur for some time, but usually it will be seen in the wood turning a dirty brown inside of a year.—The Woodworker (Indianapolis).

Poor Kiln-drying Affects Finish

When air passes through a pile of green lumber it is cooled and a downward circulation is caused. A method of piling which facilitates this was tried in the dry kiln and proved very successful in drying green maple and other wods. This improvement has enabled us to dry stock quicker and with less loss than heretofore.

One of the difficulties attendant upon kiln drying lumber is the tendency to case-harden. Steaming wood for a brief period after it was dry was tested on a commercial scale, and proved successful in removing case-hardening.

The new high velocity low superheat method of rapid drying proved satisfactory with Southern yellow pine, a carload of which was sent to the laboratory for test by a Southern lumber company. Arrangements have been made to try this process on a commercial scale. The lumber tested was dried from the green condition to 6 per cent. moisture in sixty-four hours. In other tests it was dried to shipping weight in thirty nine hours with less than 1 per cent. loss.

Experiments in kiln drying air-dried red gum were very successful, the stock being dried with less than 1 per cent. loss. Red Gum is one of the most refractory and difficult woods to dry, and this has undoubtedly had a serious effect on the extension of its markets. Experiments are now under way for kiln drying this species green from the saw.

The shape of shoe lasts makes it difficult to season the blocks from which they are made, and manufacturers have suffered serious losses in drying lasts. Experiments in kiln drying green last blocks have given promising results, about 30 per cent. of the blocks being dried perfectly in twenty-one days. Present methods of air-drying require about one and one-half years and necessitate a heavy carrying charge.—Hardwood Record.

Are High Gloss Finishes Coming Back?

By L. K. Starks

The tendency of furniture manufacturers and other cabinetmakers has been away from the gloss finishes which marked the products of other days, and one who has looked over the displays of the leading factories at the exhibitions and elsewhere would hardly be prepared to say that there is any chance of this tendency being reduced in the near future. On the contrary, the advent of period designs, which seem destined to hold the centre of the stage, particularly in high-class goods, for some time to come, would suggest that dull finishes, whether secured with water stains or with rubbed varnish, are stronger now than ever before.

The general opinion seems to be that there is nothing quite so hideous as "golden oak," and, just as the over-varnished appearance of American walnut twenty-five years ago was the signal for its dismissal from public favor, so the high gloss finishes still being ap-

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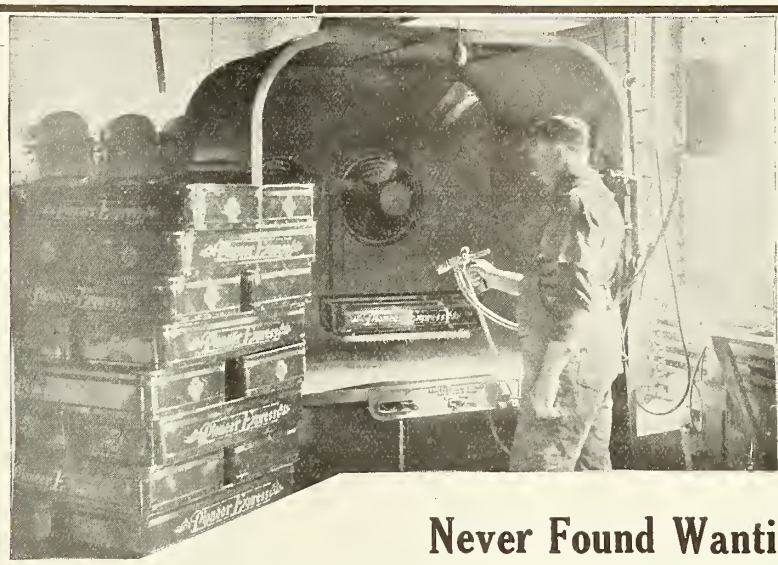

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plied to much of the oak furniture may be put forward as a handicap to its development. The oak veneer and lumber manufacturers have frequently complained that consumption is not what it ought to be, and that trade and public fail to appreciate the true value and beauty of the wood. Perhaps this is so, and perhaps the ugliness of "golden oak," with its shining varnish surface, is one of the reasons.

The walnut interests, or, more exactly, the manufacturers who have again taken up walnut, are not repeating the old mistakes, but most of it is being shown with the dull, flat finish which is characteristic of the time, and which seems more suitable for the period styles, which are now so popular. Yet a leading varnish manufacturer said recently that he believed the day of the high gloss finish is far from being over, and that it is likely to come back even more strongly in the near future.

"You hear a great deal of talk about dull finishes and the effects which are secured with stains," he said, "and yet gloss varnish remains the staple of staples. Immense quantities of it are used by the chair manufacturers alone, and in the piano trade the demand is still for the beautiful gloss, which has always been considered the finisher's greatest achievement.

"You will never find the piano trade departing from this method of finishing. Why? Because a piano is intended for use not only this year, but for many years, and even to be handed down to the next generation. Hence the manufacturer of this instrument wants a finish that is not only beautiful, but one which will protect his product.

"This is a feature which consumers may not have taken into sufficient account in studying the finishing question. Varnishes really protect the wood and save it from the deterioration which is likely to come when the wood is exposed to damage through lack of a hard, protecting coating like varnish.

"Dull rubbed surfaces are beautiful, and right now seem to be liked better than anything else, but personally I admire the gloss finishes, and cannot help believing that one of these days you will find that sort of treatment being applied more generally. But, as I have said, high gloss varnishes are not out of it by any means, though the spotlight may have been turned on other methods for the time being."—Woodworker (Indianapolis).

Glasspaper may be good or bad, and much of it is poor stuff; so when buying it, get the best. It will pay the extra cost twice over by its lasting qualities, and more than that in the amount and quality of work to be done with it.

"How We Hold Our Men"

In the February issue of System, a magazine published in the interests of business efficiency, a leading article written by Frank Disston, of Henry Disston & Sons, Inc., on the management of that well-known saw, tool, steel, and file works.

The title, "How We Hold Our Men," is the subject of this article, which describes the methods employed in handling the man problem at the Disston plant. This concern has probably a world's record for holding workers, and Mr. Disston has written in a very interesting manner of the principles on which the record is founded. According to Mr. Disston, the essence of the situation lies in the fact that all employees are treated as human beings and never as machines. Personal contact between all officials and each man who works in the shops has been a successful policy ever since Henry Disston worked at the same bench with his fellow-laborers in 1840, when he laid the foundation of the present organization. Even now no official enters office work without first having had from five to ten years of actual experience in the shops. The entire organization is so closely knit and is on such an informal basis that it most closely resembles a big, friendly family, and "red tape" is an unknown term. The "man policies" now in force are directly responsible, so Mr. Disston writes, for the success which has come to the "Keystone Works."

The article will be of interest to all employers of labor, for although the methods are styled "old-fashioned" by Mr. Disston, yet the phenomenal success with which they have met guarantees their careful consideration.

Simple as the operation looks, it is really a difficult thing to varnish. There is all the difference in the world in the way the expert man goes about it and the way the inexperienced man will work; just as there is in the handling of the paint brush by the painter and the man who isn't a painter. And there is a big difference in the work, too.

It may be taken as an axiom that changing fashions are one of the indications of progress, while unchanging convention marks a people at a stand-still or in decadence. Progressive peoples invent and originate; unprogressive peoples imitate and inherit.

Why the manufacturers of such machines do not put such a simple guard on, at the cost of about 25 cents, shows a lack of thought or imagination.

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Veneers and Panels

Animal or Vegetable Glue—Which, Why?

By G. C. Spinker

The following article on a subject of interest to veneer and glue users is reprinted from Veneers:

Somewhere in Indiana there is a manufacturer of built-up stock whose product is in much demand among furniture manufacturers. Up to a few years ago this manufacturer used animal glues exclusively, but he studied the vegetable glue question and now uses that adhesive in his work. If you could get that manufacturer into a discussion on the relative merits of animal and vegetable glues you would hear an enthusiast on the glue question and you would learn that animal glue now has about as much chance in his factory as—well, as a glistening dewdrop has of clinging to a rose in the morning sunshine.

Ask him if he really doesn't think that good animal glues have some qualities superior to good vegetable glue, and he will become both serious and sarcastic. He will admit that quality animal glue is superior for edge jointing on solid work, when the maker will not let his stock stay in the clamps long enough. He will tell you that the man who permits careless methods in his shop may get better results with animal glue; that the product, when ready to be used, is superior in smell, deterioration, general nastiness, less spreadability; that to-day it is far, far superior in price.

Eliminate generalities and get down to practical talk and you will learn why this manufacturer prefers vegetable glue. At first he was prejudiced. He had used animal glue so many years. His men were accustomed to it, and on the lookout for its eccentricities in lack of uniform quality on different shipments. He has a good trade. He feared that by changing glues the quality of his veneered work would not be up to the standard and his customers would be dissatisfied. But he investigated and learned that all kinds of laminated work, from the cheapest to the highest grades, were being built up with vegetable glue lines, and he decided that if other men could work it successfully his men could.

Then he learned that this product, when ready for use, had a greater consistency than animal glue; that heavier and special mixers and spreaders were required for its proper use; that work built up with this glue ought to remain under pressure over night, and that wood cauls were preferable to those of zinc. Then he about decided that there was too much trouble associated with a change to make it worth while.

Yet he could not rid his mind of the talk: that a pound of vegetable glue would spread farther than a pound of animal glue; that in strength tests it had proved superior; that it could be applied cold; that warming boxes and hot cauls were unnecessary; that any unused glue could remain in the kettles a number of days without injury and be used without reheating, and that it did not have any offensive odor. He knew that good veneered stock in any case was better if it remained in the presses or retainers over night, and that wood cauls were preferable to zinc except for the fact that the heat which had to be applied to them rendered them useless sooner than the metal cauls. So, after much deliberation, he made the plunge.

The manufacturer from whom he ordered his vegetable glue furnished the required equipment under a lease at a small annual rental charge. So no initial outlay was required except for a few pipe fittings, power connections, and material for a platform to hold the mixers over the spreader. A skilled demonstrator was sent to install the machinery and instruct the proper persons in every detail of the use of the glue. Then it was discovered that there was nothing difficult or complicated to learn, and after a few days the glue room became enthusiastic over its installation for comfortable reasons, as well as those previously mentioned.

Everything appeared to be working in good shape, and the demonstrator went on his way. Shortly little things began to develop which caused a scare. Veneer on five-ply tops didn't always act as it should; mahogany veneers on the built-up work showed slight stains, and sometimes checked across the grain. A telegram to the vegetable glue manufacturer brought the demonstrator back in quick time. Investigation showed that the five-ply stock was taken from the bales too soon. Instead of being left under pressure over night they had been taken out in from four to six hours, according to rush and convenience. The mahogany stains amounted to nothing, and disappeared in the finishing room. The checks across the grain were on loose-cut veneers where the loose side had ben laid out.

That manufacturer learned much from the co-operation of the glue man, and these are some of the points. Regardless of what kind of glue is used, the best results cannot be obtained if the stock contains too much moisture, and the best shop practice requires the use of a redrier. Best joints are made if the stock remains under the right pressure over night. There is such a thing as too much pressure as well as too little. Birch, maple, and other hardwoods will not adhere to each other so quickly as they will to poplar, or whitewood. First-class work requires proper attention. Oak veneers with broken flakes should be glue-sized before they are applied to the core stock, or cross-banding. Mahogany veneers sometimes check across the grain, instead of in the more familiar way of with the grain, and loose fibres raise up. This is apt to happen on loose-cut veneer when the stock is not previously glue-sized. Again, there is a comparatively cheap grade of mahogany veneer which looks beautiful, and the uninitiated may think he is getting a bargain for figure. This has what is termed the sycamore stripe, as it has a silver stripe like sycamore, only smaller. But this small silver stripe is practically dead wood, and must be handled with care if good work is to be accomplished.

Glue Foaming and What Causes It

By B. C.

There are several reasons why glue foams. It very often arises from the incorporation of minute bubbles of air with the solution when this is stirred rapidly. There may be substances present in the glue solution which render the emulsion more or less permanent, or it may be only temporary, the foam disappearing in a few moments.

Glue possessing foaming properties to a marked degree is a source of annoyance to the man laying veneers. High foaming glues are particularly objectionable when applied with a glue spreader, as the rollers agitate it so that a frothy mixture of glue and air results. The coating, therefore, that is applied to the stock is simply composed of this frothy mixture, and has not the binding qualities of glue.

If foaming occurs in the glue-spreader while working, the cause is undoubtedly due to a poor grade of glue, although too high a speed of the rollers will cause the glue to scum or foam.

If the foaming occurs in the glue pot previous to being run into the machine it is evident that there is something wrong with the glue.

A number of veneer men are of the opinion that glue should not contain a particle of grease. This is not so, as a very small quantity of grease will not impair the adhesive quality of the glue, and will improve the working qualities of the mixture. The writer held the same opinion regarding the bad effects of grease on glue until some years ago he chanced to meet a man who had had a great deal of experience in the manufacture of glue in Belgium. This man stated that about one-ninth of an ounce of beef tallow was added to a gallon in the factory with which he was connected, and that they numbered among their customers some of the largest woodworking firms in all parts of the world.

Old or sour glue will foam, but the fact that the glue is sour is so apparent from the odor that no veneer man would be likely to use it. The only thing to do with glue that has gone bad is to bury it, and the deeper the better. It should not be mixed with good glue in the hope that a small quantity of bad with a lot of good glue will not hurt. Glue should be made up fresh every day. It may take a little time to find out just how much to make up, but it will pay to take the time. The pots should always be well cleaned out before refilling.

If the veneer man thinks he is not getting good glue he should immediately report to the purchasing department, in order that they may take the matter up with the glue manufacturer. The latter will usually be found only too anxious to investigate any supposed defects in his product.

The Taping of Veneers

By W. Alexander

For taping up veneer that has been jointed, when the tape has to be applied by hand, the writer prefers cloth tape with very open meshes. This tape can be obtained in the proper width in rolls suitable for the purpose. It can then be secured in a convenient position over the bench, where it is handy to unroll it. This kind of tape has to be glued on, of course, but it will be found to hold much better than the prepared tape, which simply has to be wetted, particularly for veneer that is not perfectly flat. The prepared tape can be used, and will give good results where the work is all perfectly staight and flat.

In the majority of veneer rooms now one finds that they tape the ends of all veneer before laying it. This is a good plan. It is almost impossible to ascertain just what is saved by taping the ends unless the veneer is used for some time without taping and a record kept of the pieces that split. Even this would not give accurate information, because one batch might be perfectly free from splits and the next have every other piece split.

For taping the ends some of the prepared tapes on the market are quite satisfactory. The writer has very little use for paper tapes, however, as they are not strong enough to keep the veneer from splitting.

The question has been raised from time to time as to whether veneer should be applied with the tape outside or in. The writer's experience is that there is no hard and fast rule. It depends a great deal on the tape. The open meshed tape mentioned first in this article can be laid next the core stock without causing any ridge in the veneer, and it will take a solid grip on the core stock because the meshes permit the glue to take hold.

It is risky to lay the prepared cloth tape next the core stock unless it is well perforated. One instance is remembered, however, where cloth tape without perforations was laid next the core stock and caused no trouble. Some large tops for grand pianos were all glued ready for the press when it was discovered that the veneers, instead of being taped in pairs, had all been taped the one way. There was no time to be wasted, so half the veneers were slapped on the core stock with the tape side down, and the veneers had more than the ordinary amount of tape on them, owing to some repairs that had been made. The tops came out all right, and the pianos were sold without any person being the wiser. As a general rule, however, unless the tape is very porous it is not advisable to put the tape side to the core stock.

Drying Wood by Steam

A recent number of the London Timber Trades Journal had an interesting account of drying wood in steam. A Frenchman, M. Violette, made the experiments. The woods treated were oak, ash, elm, walnut, and fir, specimens of which he submitted to the action of a current of steam at a temperature of 100 degrees Centigrade, gradually raising it to the different points of 125 degrees, 150 degrees, 175 degrees, 200 degrees, 225 degrees, 250 degrees, without the addition of any water, so that the vapor was no longer saturated, but was rendered capable of extracting the moisture contained in the wood. Portions of the various woods were weighed and exposed to these temperatures for two hours, in closed chambers, and again weighed when cool, in order to find the amount of loss of weight by desiccation.

This loss was found to increase in a constant ratio, according to the temperature, but great variations were experienced with different woods. At the temperature of 175 degrees elm and oak lost one-third of their weight, and at 250 degrees one-half; ash and walnut lost one-fifth at 175 degrees and two-fifths at 250 degrees, and fir one-sixth and one-third at the same temperatures. Until the heat reached 175 degrees they each preserved their primitive colors, but from that point to 200 degrees a slight change took place. Above 200 degrees the color gradually deepened, and at 250 degrees oak became black. This change of tint indi-

OAK MAHOGANY CIRCASSIAN MAPLE

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WE SPECIALIZE ON—

POPLAR CROSS-BANDING AND BACKING VENEER

Highest Grade — Right Prices

The Largest Poplar Veneer Mill in the World

THE CENTRAL VENEER CO., HUNTINGTON, WEST VIRGINIA

cates the formation of tar in the wood, which seems to be necessary for its due preservation.

The particular result of these trials to which we would direct the attention of the worker in wood is the great increase in strength which this treatment causes. This has been accurately determined at the different degrees of temperature, showing the remarkable fact that timber may be thus improved in tensile strength to an immense extent. Elm obtains its maximum point of strength at a temperature between 150 degrees and 175 degrees, while that for the other woods varied from 125 degrees to 150 degrees. Ash receives an accession of two-thirds its original strength; oak, five-ninths; walnut, nearly one-half; fir, two-fifths, and elm more than one-third. The order of classification here given is according to that of the temperatures. It appears that the process condenses the fibres, and gives to the wood the properties of solidity and firmness, equalling an amount of outdoor seasoning of a number of years.

Value of Exhaust Steam

Owing principally to its latent heat, exhaust steam is of practically the same value as an equal quantity of direct steam of high pressure for heating in the winter season, and with proper arrangements, for many of the numberless operations carried on in the various industries. For all these purposes the pipes must necessarily be somewhat larger than they need be where direct steam of high pressure is used. In many cases where failure has resulted from an attempt to use exhaust for the above purpose, the result has been due to the use of a too contracted system of piping, and in other cases, to a wrongly designed system.

Where there is a demand for steam for which the exhaust may be used, or where the supply of exhaust is variable, automatic arrangements for making up the requisite quantity direct from the boilers can easily be constructed so as to always insure the maximum degree of economy. When more heat than the exhaust can furnish is wanted, the proper amount needed to supply the demand is drawn from the boilers; when the exhaust furnishes more than is needed, it can be utilized to heat feeding water, or it can be used to warm a storage tank for hot water.

Value of Trade Journals

Edwin N. Hurley, who recently retired as chairman of the United States Federal Trade Commission, says, regarding trade journals in his book, "The Awakening of Business": "American business men do not realize the value which trade journals and technical magazines may be to them in increasing the efficiency of their factories and giving them a broad, comprehensive view of their business. Our trade journals and technical papers are the best in the world, and they should be encouraged and supported by our business men. Copies should be placed where employees can see them, and they should be urged to read and study them. These papers are preaching the gospel of sound business on practical lines, and are helpful not only to business but to the country as a whole."

The man whose business has a reputation of value cannot afford to simply do as well now as in the past. He must do better.

"Where do you buy your Veneers"

MAHOGANY—
AMERICAN
BLACK WALNUT—
QUARTERED OAK-
FIGURED
QUARTERED GUM-
Rotary Cut Veneers
in Poplar, Maple,
Birch Gum and
Oak

Two prominent furniture manufacturers were conversing one day in a hotel lobby. Among other topics discussed, veneers naturally were mentioned. "I've been buying mine lately," said one, "from The Toronto Veneer Company." "But," said the other, "what difference does it make where you get them?" "Well," said the former, "I like the way The Toronto Veneer Company handle my orders. If I send in an order by mail they are very careful to give me good selections, and my orders are always up to the mark. Then, whenever I am in town I can go up to their warerooms, where they always have a good stock on hand, and choose my own figures. I like those people because they always give me a square deal."

Where do YOU buy YOUR Veneers?

Write us for prices. You will find them satisfactory. No order too large or small for our service.

TORONTO VENEER COMPANY
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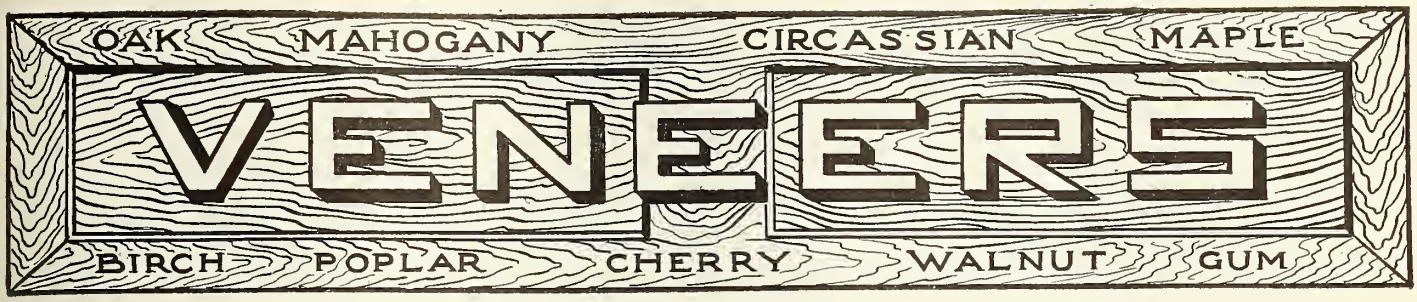

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Lumber — Dimensions — Veneers

If you are in the market for anything in Walnut, let us figure with you. We have cut three million feet of Walnut in the last year, and have a good stock of all thicknesses dry. We can also furnish Walnut dimension—**Walnut Veneers.** We have a large stock of veneers, plain, stripe figured and stump wood.

Wood-Mosaic Co., Inc.

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Write for prices on all

Plain and Fancy Lumbers and Veneers

Mahogany, Oak, Birch, Walnut, Ash, Poplar, etc., rotary, sliced or sawed in all thicknesses

Your Patronage Respectfully Solicited

Prompt attention given to all enquiries, and SAMPLES SENT IMMEDIATELY ON REQUEST, or representative will call.

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American Walnut Veneers

A larger and better assortment of AMERICAN WALNUT VENEERS in Sliced, Half Round and Stump Wood than ever before offered.

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OAK MAHOGANY CIRCASSIAN MAPLE

VENEERS

BIRCH POPLAR CHERRY WALNUT GUM

Mahogany **Figured Red Gum**
American Walnut **Curly Birch**
Quartered White Oak
(Sawn or Slice Cut)
And all other kinds of

Domestic Veneer

AND

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8th, Harriet and 7th Streets - - - - CINCINNATI, Ohio

200,000 Ft. ¼" Gum
12 to 36" wide, 60 to 84" long
DRAWER BOTTOMS
AND
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For Quick Shipment
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Write us for samples

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5 Million feet for Immediate Shipment
Any Kind of Wood Any Thickness
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will find it to their advantage to purchase from the manufacturers and dealers whose advertisements appear in this publication. They are progressive firms—the leaders in the business, which is a guarantee of good service and prompt attention to orders.

Give your business to the man who will spend his time and money to get in touch with you. He deserves it—if his stock and prices are right.

OAK MAHOGANY CIRCASSIAN MAPLE

VENEERS

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AT GRAND RAPIDS

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Poplar Crossbanding
Gum Veneers
Plain Oak
Quartered Oak
Mahogany

Immense Stocks — Right Prices
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WALTER CLARK VENEER CO.
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Indiana White Oak Lumber and Veneers

Band sawed from the best growth of timber.
We use only the best quality of Indiana White Oak.
From four to five million feet always on hand.

Walnut Lumber

Our stock assures you good service.

Chas. H. Barnaby, Greencastle, Indiana

The Glue Book

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Chapter 1—Historical Notes
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Chapter 3—Testing and Grading
Chapter 4—Methods in the Glue Room
Chapter 5—Glue Room Equipment
Chapter 6—Selection of Glue

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Woodworker Publishing Co. Limited

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Powdered Coal to Save Smoke

In spite of ordinances designed to reduce the great tonnage of soot that descends annually upon our cities, few manufacturing municipalities can yet claim to have secured marked relief from the 'smoke nuisance." But relief is apparently in sight, and from a totally unexpected source. We refer to the successful development of the progress of burning powdered coal for generating steam in locomotive and other boilers.

Pulverized till 85 per cent. of it passes a screen having 200 meshes to the inch, "soft coal" gives an almost smokeless flame when blown into a fire box with air. The quantity of air is automatically regulated by the quantity of powdered coal, so that careless firing, such as is now inevitable with hand stoking, cannot occur.

Between Chicago and Milwaukee the Chicago and Northwestern placed in service a year ago a passenger locomotive equipped for burning pulverized coal. It has been thoroughly tested in active service, and has demonstrated a marked saving in fuel. According to tests published in the Railway Age Gazette, this locomotive evaporated 13 per cent. more water per pound and consumed 18 per cent. less coal on the runs between Chicago and Milwaukee than was required with a similar locomotive fired with lump coal in the ordinary manner. Moreover, a much cheaper grade of coal was used on the locomotive burning pulverized coal.

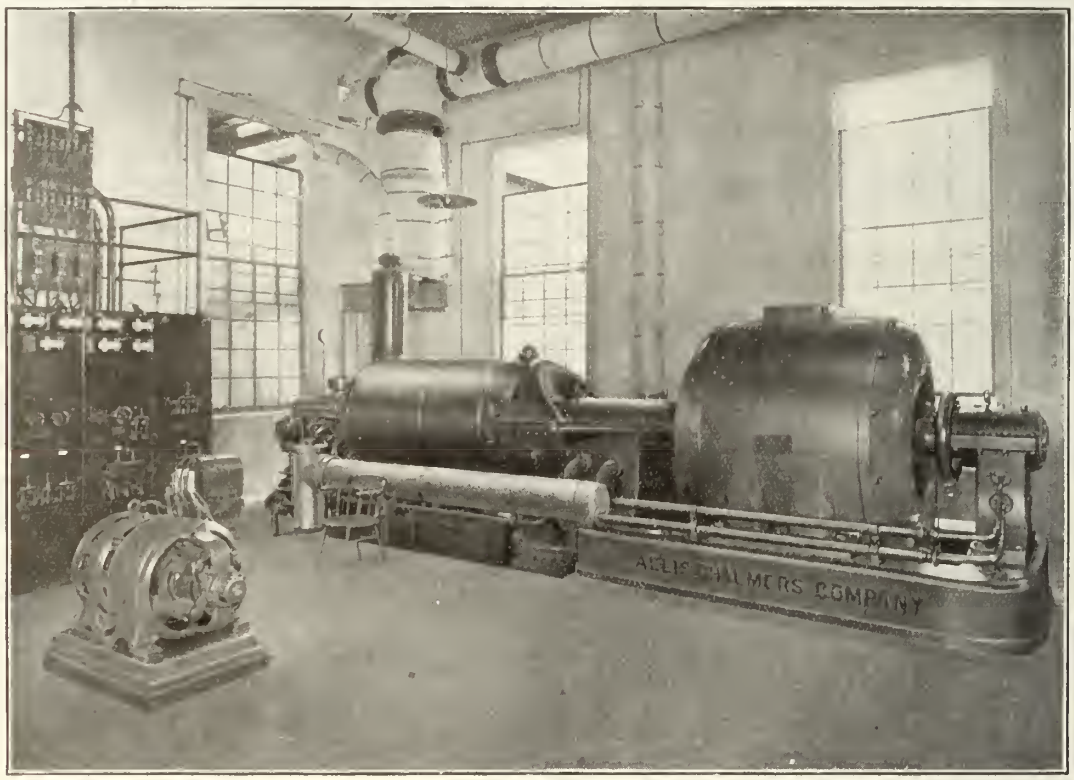
In firing up the cold locomotives only 750 pounds of powdered coal were required, as against 1,700 pounds of lump coal.

The switching engines in the freight yards of cities and the engines that are getting up steam or standing with banked fires cause a very large part of the "smoke nuisance" that has been so greatly deplored in all large cities. It would seem now that as far as locomotives are concerned this nuisance need no longer be tolerated. We go farther and predict that all large steam power plants in cities will eventually use powdered coal, not only because it will prove to be more economical, but because a smokeless city can be secured in this way.—Engineering and Contracting.

Steam Turbo Generators

By John S. MacLean, of the Canadian-Allis-Chalmers, Limited

The reciprocating steam engines continue to hold their own in many fields, but the application of electricity to woodworking machinery has great advantages, one of the most important being the facility and economy with which power can be transmitted to places which could hardly be reached by any other method. In consequence of this there is an increasing tendency to install steam turbines. On account of the small amount of space required, in comparison to their power, the steam turbo generators can often be installed in rooms where other types of prime mover would be impossible.



Steam turbo-generator in Canadian Western Lumber Company's plant at Fraser Mills, B.C.

This makes practicable the enlargement of power plants in which room is limited, whereas with other machinery it would be impossible. In many cases, also, twice the power in turbo units has been installed in the places formerly occupied by reciprocating sets. When steam turbines are used in original equipments, the reduction in the size of the power house required is an important element of saving. As the turbine has no wearing parts except the bearings and the small parts of the governor and the oil pump, the cost of upkeep is necessarily very small.

The illustration shows a Canadian Allis-Chalmers Steam Turbo Generator of 1,300 horse power capacity in the mill of the Canadian Western Lumber Company, at Fraser Mills, British Columbia.

What is Your Best Price?

An inquiry asking for that—the "best price" —makes us think one of two things: Either the man who inquires regards lumber as an *expense;* or he thinks of us as a sort of a magician with an elastic conscience—one who can make good quality from ordinary stock.

In the first place lumber is not an expense but an *investment;* it is the necessary raw material that goes into furniture, into trim, into automobiles, into everything where lumber is used.

ASH
ELM
GUM
OAK
Cottonwood

In the second place the only magic which we can command is the ability to give you exactly what you buy—GOLDEN RULE QUALITY—lumber that wil make better furniture, better trim, better automobiles.

This is just what we will do, furnish you with Southern Hardwoods that will be an *asset* as well as an investment; Southern Hardwoods that will not only make the goods that you manufacture better goods, but will be a profitable investment for both of us—the buyer and the seller.

Our stock sheet is ready for mailing now.

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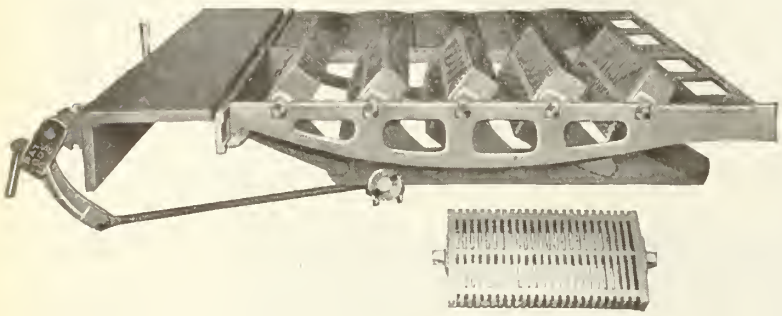
MEMPHIS
FIVE MILLS

Grand Rapids, Mich., Office
FRANK B. LANE
Houseman Bldg.

Shaking and Dumping Grate Bar

The "Cyclone shaking and dumping grate bar," as here shown, is manufactured by the Canadian Steam Boiler Equipment Company, of Toronto. The company advise us that this grate bar is the result of 25 years' experience in this particular line, adding one improvement after another until the present bar has been evolved.

The advantages claimed for the Cyclone bar are that it can be used with any class of fuel; that a few simple movements of the shaking lever will riddle



Cyclone shaking and dumping grate bar.

all ashes out of a fire, thus giving conditions whereby nearly perfect combustion is obtained; and that when fires are being cleaned the hot clinkers can be dumped in the ash pit, thus saving firemen from the heat which this operation gives when straight bars are used.

The company state that the Cyclone grate bar is installed in many large plants and institutions in Canada, and is giving splendid satisfaction.

High and Low Pressure Trap Installation

The illustration of a boiler shown herewith shows a combined high and low pressure return trap installation. On the floor is placed a lifting trap, receiving low pressure condensation from the heating system, dry kilns, etc. This trap can receive the returns down to the atmosphere pressure or below. All that is necessary is that it be placed below the lowest return. The returns then run into the tank of the trap the same as into an open receiver, there being a relief valve to eliminate all air. When the tank becomes full of water it overbalances the large weight and dumps. In doing so it comes in contact with a lever which pivots and opens up the main line steam valve, which is connected direct from the boiler. The live steam then forces the water in the tank up to the return or boiler feed trap, and the tank, when empty, tilts back for another load.

The operation of the boiler-feed trap is the same. The steam comes in contact with the water in tank, equalizes its pressure the same as in the boiler, whereupon, it being situated above the water line in the boiler, it simply flows in by gravity, in that way putting the condensation back into the boiler without cooling it down, and thus saving a great amount of fuel which would necessarily need to be burned if water were to be cooled down.

In the cut is also shown a receiver, into which all high pressure returns from glue lines, hot rooms, etc., accumulate. The pressure behind these returns forces the condensation up and into the boiler-feed trap, which then goes through the same process as above stated.

It is a well-known fact that the oil has to be separated from the exhaust steam of an engine before it can be used for heating purposes. The accompanying cut shows a simple method by which this can be done. A tank is provided large enough to allow the steam to expand, thereby causing the temperature to drop. The inlet pipe enters at top down about one-third the distance, shooting down on approximately two to three inches of water. The water is from the condensed steam, and is always there up to the overflow point. When once the oil strikes the water it will not raise again, therefore a dry steam, free from oil, which can be used for any heating purpose, is obtained. The condensation from same can be put back into boiler without danger.

The return trap, boiler feed trap and oil separator described here are manufactured by the George W. Cole Company, 838 Dundas Street, Toronto.

The table of fuel losses shown here was furnished us by the Geo. W. Cole Co. The table represents the losses which are said to be occasioned by feeding condensation to boilers with steam pump instead of direct return trap. A steam pump is said to use at least 100 pounds of live steam for 1 h.p., whereas a direct return trap takes only 10 pounds of live steam to do the same amount of work.

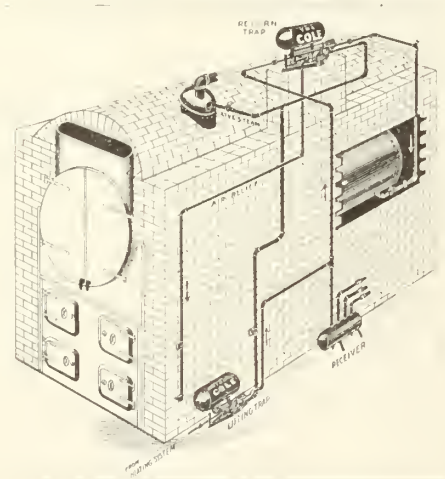
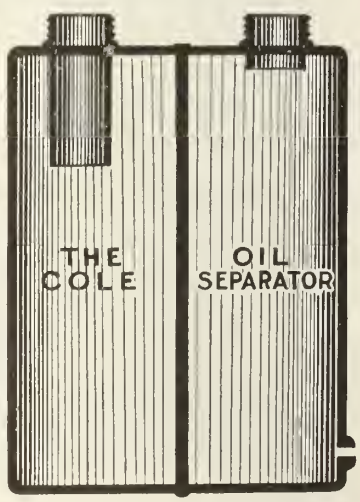


Diagram showing installation of high and low pressure traps.

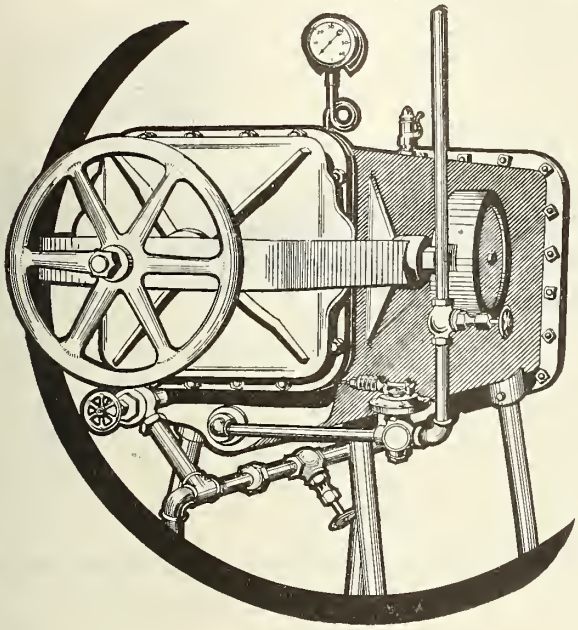
TABLE showing FUEL LOSSES due to Feeding Condensation to Boilers with Steam Pumps instead of Direct Return Traps

Steam Pressure	Temp. of Condensation	Aver. Temp. Steam Pump	Temp. of Return Trap	Per Cent of Fuel Wasted
28 Vac.	101. F	Average Feed Temp. through Pump, 180 F		
26 "	125. F			
24 "	140. F			
20 "	159. F			
16 "	176. F			
10 "	192. F		188. F	0.96
5 "	208. F		204. F	3.00
0 Atm	212. F		208. F	3.3
2 lbs.	219. F		215. F	4.2
5 "	228. F		224. F	5.3
10 "	240. F		236. F	6.7
20 "	259. F		255. F	9.0
25 "	267. F		263. F	10.0
50 "	298. F		294. F	13.7
80 "	323. F		320. F	16.4
100 "	338. F		334. F	18.5
110 "	344. F		340. F	19.2
125 "	352. F		349. F	20.3
150 "	366. F		362. F	21.8
200 "	388. F		385. F	24.6



For separating oil from exhaust steam.

Wood Steaming Retort



Wood Bending Manufacturers:

This is one of our

Perfection Retorts

which we guarantee will save you

50% Less Breakage

in your bending department than your present process; that your stock will dry in your forms or presses in one-third less time; that you will have no stained stock; that your stock will retain its shape much better after being bent; that it will dry in your dry-kiln in one-half less time and that your steam consumption will be reduced at least 90 per cent.

The door can be opened and closed in ten seconds, and it is steam and water tight and for this reason can be placed anywhere in your factory.

Compare this IMPROVED RETORT with your present steam boxes, then write us for our Booklet on Progressive Wood Steaming.

Made in Preston, Ontario

Perfection Wood Steaming Retort Co.

PARKERSBURG - WEST VIRGINIA

Please See Below!

FOR SALE

5 cars 4/4 in. No. 2 common and better Dry Black Ash.

3 M. ft. 6/4 in. No. 1 common and better Dry Black Ash.

2 cars 4/4 in. No. 3 common Dry Black Ash.

2 cars 4/4 in. No. 2 common and better Dry Winter-cut Basswood.

1 car 4/4 in. No. 2 common and better Green Winter-cut Basswood.

3 cars 4/4 in. No. 2 common and better Dry Basswood.

2 cars 4/4 in. No. 2 common and better Winter-cut Hard Maple.

1 car 14/4 in. No. 1 common and better Winter-cut Soft Maple.

1 car 6/4 in. No. 1 common and better Dry Birch and Maple.
Abt. 2/3 Birch; 1/3 Maple.

1 car 4/4, 5/4, and 6/4 in. No. 2 common and better White Ash (mostly 6/4 in.).

3 cars 4/4 and 8/4 in. No. 2 common and better Dry Red Oak.

2 cars 4/4 in. No. 2 common and better Soft Elm.

2 cars 8/4 in. No. 1 common and better Soft Elm.

2 cars 12/4 in. No. 1 common and better Soft Elm.

We Shall Be Glad to Serve You

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Mills at—Byng Inlet, Ont.

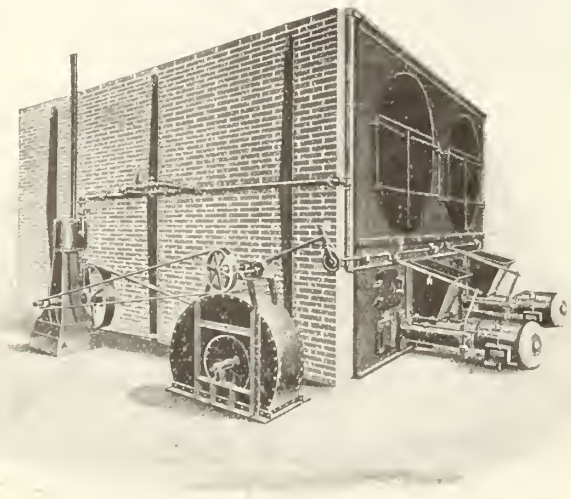
and

Deer Lake, Ont.

Jones Underfeed Stoker

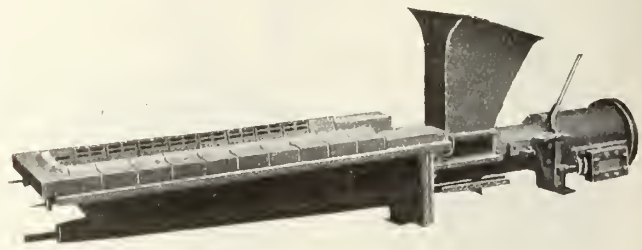
The accompanying illustrations show the Jones underfeed stoker. With this stoker the fuel is fed into the fire by means of a ram working in a bath-tub-shaped retort which is shown in one of the illustrations. Solid dead plates extend from the rim of the retort to the side wall of the furnace. These dead plates occupy the location of the grates of an ordinary hand-fired boiler, but there are no openings through which fine coal may drop into the ash pit.

The advantages claimed for the Jones Underfeed Stoker are:—There are no moving parts in contact with the fire. The main ram does not enter the furnace. The auxiliary pusher is down in the bottom of the retort and is protected by the green coal. The air for combustion is supplied through the tuyere openings along the rim of the retort, the air being discharged at a point about where the gases are liberated in the process of coking. The heat of the fire on top of the green coal cokes the coal next in contact and the gases liberated must pass through the fires, and therefore cannot escape to the chimney unburned, as the supply of oxygen forced into the furnace is also pre-heated, being in contact with the furnace castings before entering the furnace. Ignition of the gases within the furnace, therefore, readily takes place. The remaining combustible is burned out into a clinker along the sides of the furnace, accumulating on the dead plates, and is removed through cleaning doors in the front for six or eight hours, depending on the percentage of ash in the coal and the load carried.



Showing Jones stoker attached to boilers.

The speed of the blower equipment used in connection with the stokers is regulated by a steam pressure control which is also attached to the valves of the stoker so that the coal and air may be proportioned to suit the operating conditions and the steam pressure maintained automatically.

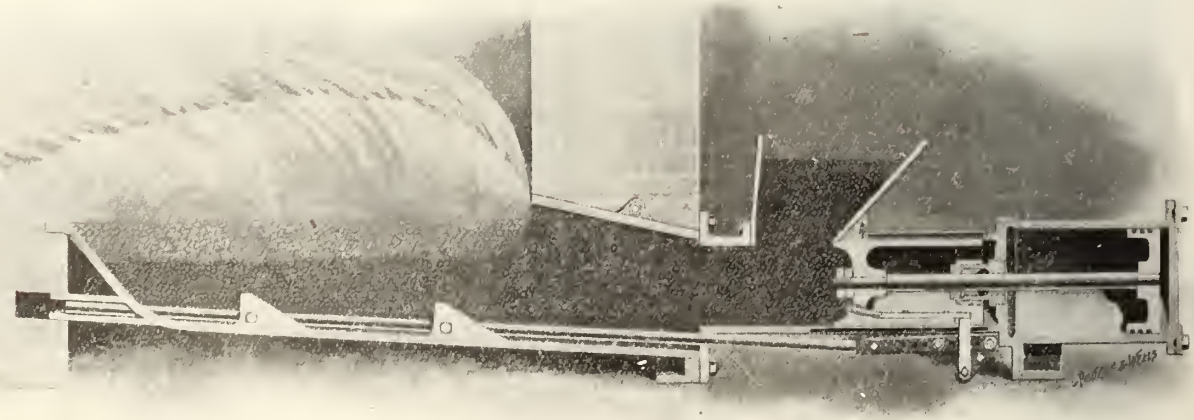


Bath-tub shaped retort for feeding coal.

Engine Foundations

"It is of the greatest importance that a steam engine be placed on a firm and unyielding foundation. It would be poor economy to pay for a good engine and then place it upon a foundation that could yield to its weight and working strain, so as to get the parts out of line and thus cause a permanent injury.

"The foundation may be built of good brick, stone, or concrete, with cut stone or concrete caps; in all cases hydraulic Portland cement should be used for mortar. Should the ground be soft and yielding, a hole should be excavated somewhat larger and deeper than the bottom of pier and filled in with stones properly grouted with hydraulic cement; on this the masonry may safely be built. The holes for foundation bolts should be left somewhat larger than the bolts, so that a slight movement may be possible in adjusting the engine to the proper line. The foundation should be completed a considerable time before placing the engine on it, to allow cement to get thoroughly set.



Longitudinal section through furnace and stoker.

Dry Hardwood

300 M. 1 in. No. 1 and No. 2 Com. Southern Plain Oak.

About half each Red and White. Can sort for grade and color. This is fine stock.

3 cars 1 in. FAS Quartered White Oak.

3 cars 1 in. No. 1 Com. Quartered White Oak.

This is well manufactured, nicely figured stock.

3 cars 1¼ in. No. 1 Com. and Btr. Plain White Oak.

Good widths and lengths. Ready for shipment.

Also have full stock of all kinds of Northern Hardwoods

Payson Smith Lumber Co.

Chicago Office: 1665 Old Colony Bldg. J. C. Moffat, Rep.

Minneapolis, Minn.

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DIMENSION STOCK

Will save you money, increase your capacity and make higher grade Furniture, because it is clear

2 cars 3x3 8 ft. clear Sap Gum.
2 cars 2x2 8ft. clear Sap Gum.
1 car 2x2 48 in. clear Oak Squares.
5 cars 2x2 30 in. clear Sap Squares.
1 car 2½x2½ 30 in. clear Sap Squares.
1 car 2x2 30 in. clear Red Gum.
3 cars 2x2 30 in. clear Oak Squares.
1 car 2x2 30 in. clear Ash Squares.
2½x2½ 30 in. clear Ash Squares.

Write us when in the market for all kinds of HARDWOODS, cut to your sizes.

The Probst Lumber Co.

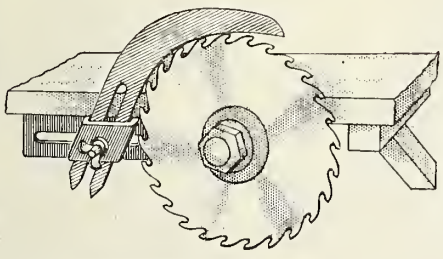
Cincinnati, Ohio

Why Pay More?

The CHEAPEST and SIMPLEST

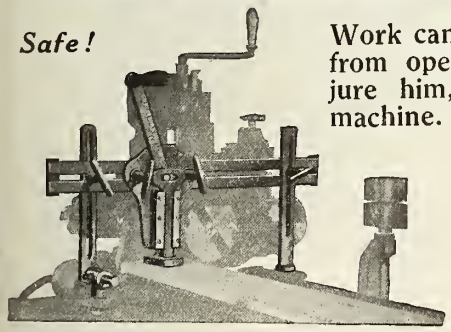
SPLITTER SAW GUARD

Does the work for saws of any diameter



Tenoner Hold-Down and Safety Guard

Safe!



Work cannot get away from operator and injure him, or damage machine.

QUICKLY ATTACHED without boring or tapping

Write For Catalogue

Gustafson & Scott Mfg. Co.

(NOT INC.)

4315 Wabansia Ave. - CHICAGO, ILL.

"SPECIAL"

Important Used Machines For Sale. Will Pay to Inquire.

Chain Saw Mortisers (3).
42-in. Royal Invincible 3-Drum Sander.
60-in. Columbia 3-Drum Sander.
Berlin Matcher No. 94.
Berlin Band Resaw, 54 in.
Mereen Horizontal Resaw.
Schimmel-Reid Belt Sander.
Hayes Double End Tenoner (best made).
American Sash Dovetailing Machine.
Heald Sash Trimmer.
Hayes Dowel Door Outfit (capacity 1,000 doors per day), and many other fine used machines, Moulders, Power Feed Rip Saws, etc., etc.

WRITE NOW.

J. L. NEILSON & CO.

WINNIPEG, MAN.

Heavy Duty Side Crank Engine

The Waterous Engine Works Company, Limited, Brantford, Ont., in speaking of their side crank engines state that thirty years ago, when steam pressures as low as 85 lbs., were used in woodworking plants, that their engines were very popular in Canadian factories. The increase of steam pressures to 100 and 125 lbs. threw a great deal of extra strain on the engine, so that in order to maintain their original factor of safety the company had to re-design their engine in every part. This engine as re-designed is called the "Heavy duty" side crank engine and an illustration of it is presented herewith.

The company state that the frame, the cylinder, the bearings and all moving parts have been improved in design and strengthened in construction, but that with these changes the simplicity and good workmanship has been retained, and that as regards the ability of the heavy duty engine to stand up to a full day's work continuously it is the same side crank engine they sold thirty years ago, but is thirty years better. The company recommend this engine for factories where continuous service with the minimum amount of attention is required.

The Waterous "Heavy duty" side crank engine has a bored steam chest and the valve rocks like a Corliss valve, although its action is precisely the same as that of a slide valve. In most of the engines the valve has a second port cast through it. This makes it similar to the "Trick" valve. The object of this second port is to obtain greater speed and greater area of port opening with less valve travel than can be had with the common D slide valve.

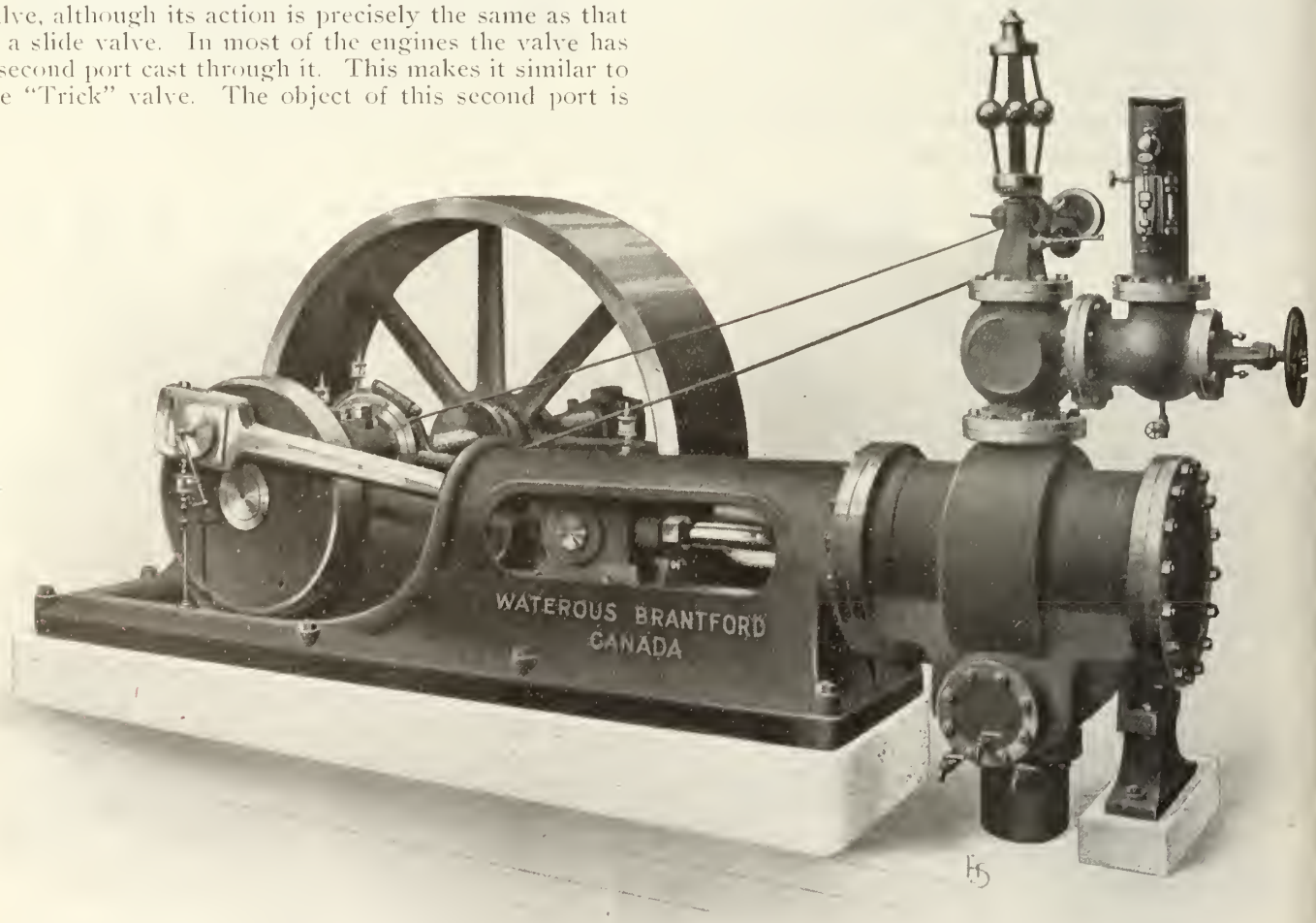
Besides the engine illustrated the Waterous Commany manufacture a side crank engine in twin setting. This arrangement is mostly used where large horsepowers are required and is recommended by the company on account of its steadiness and uniformity of operation. In the twin setting steam is supplied through the main pipe with governor so arranged and connected that steam distribution to both cylinders is uniform. Cranks are quarter set and the large flywheel and driving pulley are carried on the main shaft which connects them.

Too much reliance must not be placed on the gauge glass. If the water is muddy or contains soda, it is liable to foam, and the glass cannot give the true water level.

A commercial horse power is assumed by engineers to require the consumption of five pounds of coal per hour.

Don't think to save money by doing without your trade paper. You will find this loss, not gain.

Someone has wisely told us that the best known remedy for laziness is to go to work!



Waterous "heavy duty" side crank engine.

PERIOD CARVINGS FOR FURNITURE

We have published a new complete catalogue.

Will send on request.

DECORATORS SUPPLY COMPANY

Archer Ave. and Leo St. CHICAGO, ILL.

Subscribers' Information Form

Many letters reach us from subscribers enquiring where a certain machine, a certain kind of lumber or veneer, or some other class of goods, can be obtained. We can usually supply the information. We want to be of service to our subscribers in this way, and we desire to encourage requests for such information. Make use of this form for the purpose.

Date.....1917

CANADIAN WOODWORKER
AND FURNITURE MANUFACTURER,
345 Adelaide Street West, Toronto.

Please tell us where we can procure .....

.....

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Name .....

Address .....

News of the Trade

The name of the Berlin Office Fixture Company, Limited, has been changed to the Art Furniture Company, Limited.

The capital of the Victoriaville Furniture Company, Victoriaville, P.Q., has been increased from $60,000 to $99,000.

John Perry, of Galt, Ont., who was for some years identified with the Victoria Wheel Works, Galt, Ont., has died at the age of 82 years.

The planing mill owned by Phippen Bros., at 746 Pape Avenue, Toronto, has been damaged by fire. The loss is estimated by the owners at about $1,300, of which the greater portion is on the contents of the building.

The Furniture Manufacturers' Safety Association opened offices at 712 Excelsior Life Building, Toronto. The office will be in charge of Mr. Tobin, formerly of Woodstock, who has been appointed secretary of the association.

The well-equipped woodworking plant of the Terminal Construction Manufacturing Company, Limited, on 12th Avenue, Vancouver, B.C., is again operating on a small scale after a three year shut-down, due to dullness in the building line.

The Brantford Piano Case Company, of Brantford, Ont., are erecting a 70-foot addition to their plant. This company manufacture the Brant-ola phonographs and it is to take care of the increased demand for these instruments that the new addition is being built.

Mr. G. E. Smart, master car builder of the Canadian Government Railways, has been elected president of the Canadian Railway Club, Montreal, and Mr. C. W. Van Buren, master car builder of the C. P. R., vice-president. Mr. J. Hendry, master car builder of the Grand Trunk, is a member of the executive committee.

It is reported that the plant of Taylor and White, barrel manufacturers at St. John, N.B., which was recently destroyed by fire, is likely to be rebuilt. The demand for barrels is said to be so urgent that Messrs. Taylor and White plan to erect, as soon as possible, a larger plant close to the site of the old one.

The C. B. Williams Company, who operated a planing mill at 11 St. Albans Street, Toronto, has been reorganized. New capital has been introduced and the company will manufacture millwork and woodenware of all kinds. The new company will be known as the C. B. Williams Company, Limited. The provisional directors are T. V. Gearing, W. Gilchrist and J. Stewart.

The Peterboro Planing Mill Company, Peterboro, Ont., are working on an order for 25,000 two round, six inch mark No. 3 shell boxes. The company have an order on hand for 5,000 of the three round 4.5 boxes which they will be starting on very shortly. Mr. Fitzgerald, the manager of the company, advises us that they are experiencing no difficulty in securing labor, except that they are compelled to pay somewhat higher wages.

The Canada Furniture Manufacturers Ltd., of Woodstock, Ont., have responded to the Government's appeal regarding the production of food stuffs. They have put under the plough for the benefit of such employees as care to take advantage of the opportunity, several acres of land adjacent to their factory in Woodstock. This will be divided into ten or twelve good sized garden plots. A number of the company's employees have applied for allotments. These have been given them on condition that they will cultivate them and raise substantial crops.

Lieut. Geo. H. Rathbone, son of Geo. Rathbone, of the well-known woodworking firm of Geo. Rathbone Ltd., Toronto, is reported missing in France. Lieut. Rathbone was employed as an observer in the Royal Flying Corps. The report states that he has been missing since April 29th, but hope has not been given up that he may have become a prisoner with the Germans. No word of his having been killed has been received and as both the enemy and the allies always carry a wreath to their opponents' lines and drop it to announce the death of an enemy aviator, and no such word has been received in Lieut. Rathbone's case, good reasons for hope are reported.

Mr. Villiers, of Graves, Bigwood & Co.

We are pleased to present herewith a portrait of Mr. C. Villiers, of the well-known lumber firm of Graves, Bigwood and Company, Toronto. As announced in our last issue, Graves, Bigwood and Company have opened an office at 327 Coristine Building, Montreal. Mr. Villiers, who is in charge of this office, has had experience in all branches of the lumber business, from the woods operations to the selling of the finished product.

He commenced on the inspecting end at the mills

Mr. C. Villiers

of the company at Byng Inlet, and also had experience in measuring and cutting logs in the woods. From then, until the present, he has gone through the various lines of the company's operations, and is familiar with its business throughout. Subsequently he went upon the road for the firm in Northern Ontario, and in the Montreal district. He has been travelling the district east of Toronto for the past five years. Before his connection with the firm of Graves, Bigwood and Company, Mr. Villiers was with the Conger Lumber Company at Parry Sound.

Mr. Villiers is well known to the trade throughout eastern Ontario and with the increased facilities afforded by the opening of a new office at Montreal he will be able to increase the company's extensive business in eastern Canada. The object of the company in opening this office is to keep more closely in touch with their eastern business, which has been extending greatly during the past few years. Mr. Villiers will not devote his time solely to the selling end of the business, but will attend also to the purchasing of eastern stocks.

INTERNATIONAL TIME RECORDER

It started the Manager thinking—

He came down to the factory early one morning and noticed that some of the men didn't get in until a few seconds after 7.30. That meant of course that they didn't start to work until a few minutes later. It was only a few minutes but he figured that those few mintes wasted by many of his employees every morning and noon hour in the year, amounted to many dollars loss annually. He decided to stop it and began to look around for a means to keep a closer check on his employees' time. Of course he installed Internationals.

INTERNATIONAL TIME RECORDER

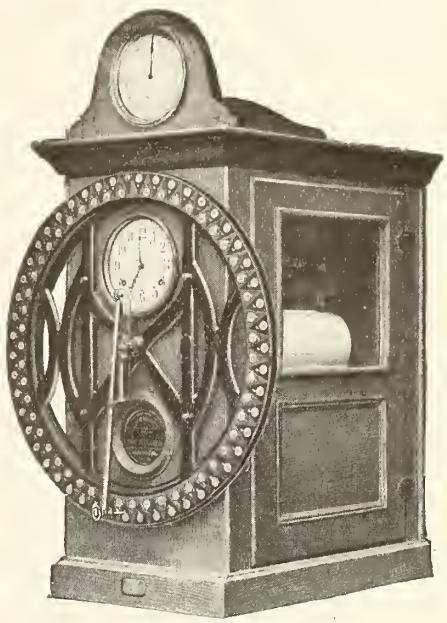
eliminates waste and expense

The Dial Recorder illustrated here is one of the most popular systems. A glance at the time sheet tells you just what time every employee entered the plant. It is impossible to tamper with, and is practically fool-proof.

The Card Recorder suits many businesses best. The Cost Recorder gives you an accurate statement of the time taken for each job.

There is an International for every kind of business.

We have helped many manufacturers to a solution of their time-keeping problems—we can help you, too. It costs you nothing to investigate and it may save you hundreds of dollars that are now being wasted.



Write TO-DAY for full particulars. Our 30 years' experience should be valuable to you.

The International Time Recording Company of Canada, Limited

Montreal Office
W. A. Wood, Jr., Cartier Bldg., 212 McGill St.

TORONTO
F. E. Mutton, General Manager, Anderson and William Sts.,

Winnipeg Office
George Morris, 400 Electric Railway Chambers.

VANCOUVER OFFICE—R. Donohoe, 817 Pender St. W.

The Watch-man of Your Pay Roll

FOR SALE

Gliding Casters "evergrip," about six hundred sets, mostly ⅝ in.; some ½ in., ¾ in. and ⅞ in. Low price for quick sale. Box 25, Canadian Woodworker, 345 Adelaide St. W., Toronto. 5-6

Dry Spruce For Sale

250,000 ft. 1 x 4 9 in. M. R., good widths.
200,000 ft. 1 x 4 in. and up No. 2 mill cull White Pine.
200,000 ft. 2 x 6 in. and up No. 2 mill cull White Pine.
100,000 ft. 1 x 10 12 No. 1 mill cull White Pine.
Mill Run White Pine Lath.

The Elgie & Jarvis Lumber Co. Limited
18 Toronto St., TORONTO, ONT.

Planing Mill Machinery For Sale
at Fort Erie, Ontario

1. Cowan & Company 13 in. Moulder.
1. MacGregor & Gourlay Co. 2 Drum Sander.
1. Ross, 4 Side Planer and Moulder.
1. Cowan & Company Self Feed Rip.
1. Cowan & Company Jointer, 8 ft. 6 in. bed.
1. MacGregor & Gourlay Co. Planer.
1. Fairbanks & Morse Gas Engine, 36 H.P.
1. Power Mortiser, Cowan & Company.
1. Jig Saw.
1. Wood Frame Sticker, 1 Side Machine.
1. Blind Slat Sticker.
1. Boring Machine.
Quantity of Belting and Pullies.
2. Blind Slat Tenenors.
Quantity of Planing and Molding Knives.
1. Platform Scale, 240 lb.
1. Electric Motor.
1. Dynamo, 50 Volts.
1. Shop Tools, Jack Screws, etc.

with other pieces, making practically full equipment for a planing mill and contracting business. Offers en bloc or per item.

J. B. JARVIS, Trustee,
18 Toronto Street,
TORONTO, ONT.

Unsuspected Heat Losses

Engineers and managers of power plants have been endeavoring to effect economies in every possible way on account of the unprecedented rise in the cost of coal. Every improved device that can be used in a boiler room to increase economy has been adopted, and striking improvements have been made in many plants. Generally, however, all attention has been directed to improved methods of burning the coal and to using the steam at best economy in the engines; but frequently little thought is given to losses that may occur between these two important parts of the plant—that is, losses in the steam piping from unnecessary radiation.

Often steam-pipe joints are not covered by insulating material, for many engineers hold that these must be accessible to tighten or re-pack when leaks occur. A ten-inch extra-heavy pair of flanges with steam at one hundred and sixty pounds pressure and with an average boiler-room temperature of ninety degrees will radiate the equivalent to over a ton and a quarter of coal per year, if steam stays on the pipe for twenty-four hours each day. About a ton of coal can be saved by covering this carefully with two-inch asbestos blocks, cement and canvas; and at the present prices of coal, the saving in one year would pay for having the covering put on.

There are other exposed surfaces, such as the bonnets of valves, drips to taps, the bodies of traps themselves and the cylinders of duplex pumps, that could be covered to advantage. An inspection of the average plant will reveal quite a lot of such exposed surfaces even on the high-pressure piping. Moreover, insufficient thickness of covering is frequently an unsuspected source of heat loss.

These losses continue whether the plant is running or not, so long as steam is kept on the line. The sum total of all them in many plants will amount to an appreciable percentage of the total coal burned, and the greater part of these losses can be easily prevented. It is therefore the duty of every responsible engineer, during these days of coal shortage and high prices, to assure himself that the losses from improper and insufficient pipe covering are reduced to a minimum.—Power.

Cabinets for X-Ray Machines

An important lumber consuming industry is the manufacture of X-ray machines. The makers of equipment of this character have learned that the cabinets are almost as important as the apparatus which they contain, and they are accordingly putting more time and thought into their design. While some of the smaller houses in this field buy their cabinets, the big fellows have their own shops and make and finish the boxes as well as the mechanical parts.

Attention was recently called by the sales manager of a concern in this field to a handsome model which looks not unlike a large-size phonograph. It would make a fine and impressive appearance in the office of the doctor who used it.

"That is not one of the least of its advantages," explained the sales manager, commenting on this feature. "Many doctors have their own X-ray outfits now, and these are helpful in showing their patients that they are prepared to give them any kind of treatment or diagnosis that may be required. A model of this kind makes a handsome piece of office furniture, and serves a double purpose for the physician who uses it. Yes, we cut up a good deal of lumber for these cabinets."

Most of the X-ray cabinets are of oak, though some are of birch and other woods that lend themselves readily to "mahoganization."—Hardwood Record.

WATCHMAN'S CLOCKS
Hardinge Portable
The only unlimite System.
Patrol clock, each $39.60 complete.
Stations, any number needed $4.10.
Also Key Type Clocks, limited capacity.
F.O.B. Toronto. Write for catalogues.
SIGNAL SYSTEMS, LIMITED
110 Church Street - - Toronto

PETRIE'S MONTHLY LIST
of
NEW and USED
WOOD TOOLS
in stock for immediate delivery

Wood Planers
30" Whitney pattern surfacer.
26" Revolving bed single surfacer.
26" Revolving bed double surfacers.
24" Galt, revolving bed.
24" Single surfacers, various makes.
22" Stationary bed surface planer.

Band Saws
42" Fay & Egan power feed rip.
36" Crescent, pedestal.
30" Ideal pedestal, tilting table.
26" Crescent pedestal (2).
20" Crescent pedestal (2).

Saw Tables
No. 2 Crescent, combination.
No 5 Crescent, sliding top.
Ballantine variable power feed.
Preston variable power feed.
Cowan heavy power feed, M138.
12' Defiance automatic equalizer.
MacGregor Gourlay railway cut-off.
6' Crescent iron frame swing.

Mortisers
Cowan hollow chisel, M190.
Galt upright, compound table.
Fay graduated stroke.
No. 2 Smart foot power.
No. 1 Smart foot power.

Moulders
13" Clark-Demill four-side.
12" Cowan four side.
10" Houston four side.
6" Cowan four side.
6" Dundas sash sticker.

Sanders
24" Fay double drum.
12" C.M.C. disk and drum.
18" Crescent disk, adjustable table.

Clothespin Machinery
Humphrey No. 8 giant slab resaw.
Humphrey gang slitter.
Humphrey cylinder cutting-off machine.
Humphrey automatic lathes (6).
Humphrey double slotters (4).

Miscellaneous
Fay & Egan 12 spindle dovetailer.
MacGregor Gourlay 12 spindle dovetailer.
Cowan dowel machine, M80.
Cowan post boring machine, M85G.
Galt blind slat re-saw.
Cowan sash clamp.
Egan sash and door tenoner.
Fox wood trimmer.
No. 6 Lion universal woodtrimmer.
Single spindle wood shaper.
48" 3 saw edger.
20" American wood scraper.
16" Ideal wood lathes (3).
4-head rounding machines.
Cowan spindle carver, M63.
Cowan veneer press screws.
No. 1 Hart automatic saw filer.

Prices, Descriptions and Full Particulars on Request

H. W. PETRIE, LTD.
Front St. W., Toronto, Ont.

Try our

Double "Perforator"

Tapes for your
CROSS Banding.

They give you the best

Possible Results

for this work.

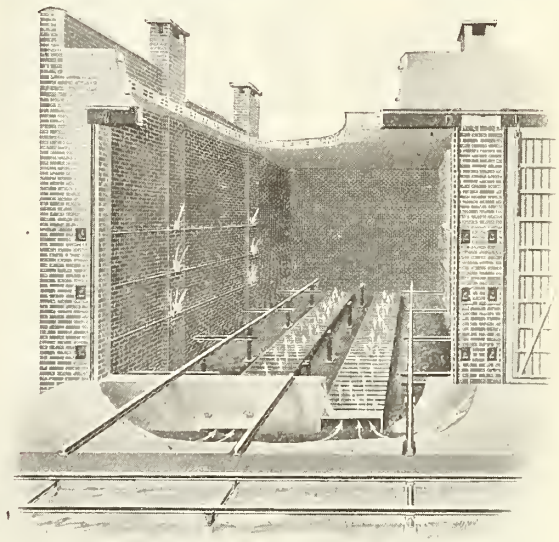
Keep a sample book of all our veneer tapes on file.

Ideal Coated Paper Co.

Veneer Tape Specialists

Mill and Office - BROOKFIELD, MASS.

Do you regard Dry Kilns as a painful necessity or as a valuable asset?



That will depend on whether or not you have NATIONAL Kilns.

National owners regard them as assets.

Ask for Catalog.

THE NATIONAL DRY KILN CO.

1117 East Maryland St., INDIANAPOLIS, Indiana

COMPLETE BENDING EQUIPMENT

For Automobile—Wagon—Vehicle Felloes—Hounds and Sled Runners. Located — Kile Mfg. Co., Akron, Ohio, which concern have recently discontinued. Everything well taken care of and very fine shape. Cost new to-day over $10,000.

1—No. 50 Defiance Extra Heavy Felloe, Hound and Bow Bending Machine. Bends from 13½ in. up to 72 in. circle, up to 6 in. thick and 12 in. wide; bends bows 36 in. to 44 in. wide; capacity sufficient to bend 500 forms of medium-sized stock in ten hours; completely equipped—excellent condition; weight 7,900 pounds.

20—Defiance Collapsible Bending Forms. One each:

17 in.	24 in.	33 in.	42 in.
19 in.	26 in.	34 in.	44 in.
21 in.	28 in.	36 in.	45 in.
22 in.	31 in.	38 in.	47 in.
23 in.	32 in.	40 in.	49 in.

2—Defiance Hound Bending Forms.

32—Pieces Special Strap Steel, 14 in. wide, 4½ ft. long.

20—Pieces Special Strap Steel, 13 in. wide, 4 ft. long.

70—Pieces Special Strap Steel; punched for ends; 12 in. wide, various lengths.

About 600—Malleable Iron Shackles.

About 100—Sled Runner Shackles.

About 50—Sets End Castings.

1500—Wood Head Blocks (in various lengths).

870—12 in. Bending Straps. Are complete and fitted with end castings.

90—42 in.	70—60 in.	36—79 in.
85—46 in.	40—66 in.	67—84 in.
46—48 in.	47—68 in.	57—88 in.
135—52 in.	28—70 in.	22—96 in.
52—55 in.	67—74 in.	20—120 in.
		8—132 in.

64—Bending Straps—13 in. All complete and fitted with end castings.

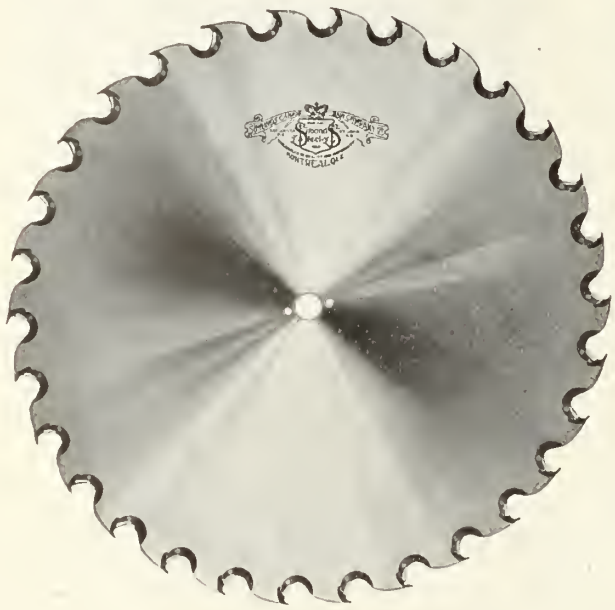
23—55 in.
24—64 in.
17—68 in.

PRICE, for complete equipment, as above enumerated, $3,000.00

Write quick—Subject prior sale

Wayne Machinery Company, FORT WAYNE INDIANA

SIMONDS



SAWS and KNIVES

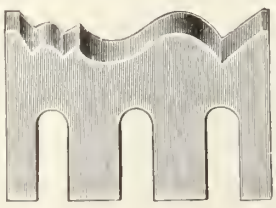
It will be to your advantage to use Simonds Saws and Knives for the reason that they give better service, which means more cutting at less cost of up-keep, cost of filing, delays for changes, etc. These are the important features, rather than what a Saw or Planer Knife may cost when first purchased. But here, too, Simonds are to be preferred because their original purchase price has been reduced to the lowest figure consistent with high quality of material and workmanship necessary to produce these result-getting saws.

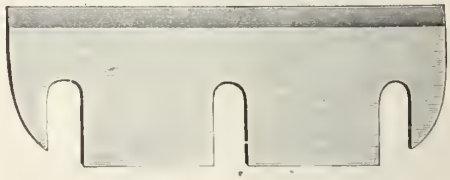
We have a catalog which we will be glad to send any wood-working or furniture factory or planing mill foreman, super-intendent, or purchasing agent, upon request.

Simonds Canada Saw Co., Limited

St. Remi St. and Acorn Ave.,

Vancouver, B. C. MONTREAL, QUE. St. John, N. B.





Faultless Casters

Full Size C-3-5

are the leaders—because of the pivot bearing, and the high quality of material which makes up the individual parts.

THEY NEVER REFUSE TO TURN. THEY NEVER DROP OUT.

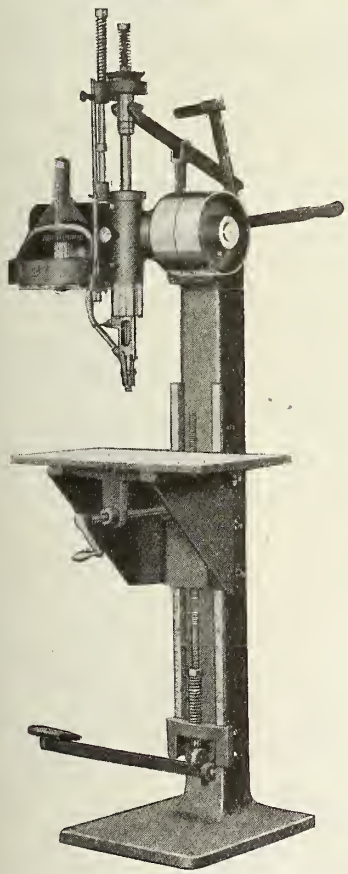
Gold Medal, Highest Award, at the Pan-Pacific International Exposition, 1915, on "Furniture Casters of all Types."

Send for samples

Faultless Caster Co.

Evansville, Indiana, U.S.A.

"Move the FAULTLESS way."



No. 2 Standard Type Automatic Screw-driving Machine.

The Only Way to Drive Screws

There is a stage-coach method and a modern method of doing everything. When it comes to driving screws the only modern way is with an Automatic Screw Driving Machine, which means greater and better production and greater profit.

The Reynolds Automatic Screw-Driving Machine

is guaranteed to produce results. It is no experiment. The No. 2 Standard Type, shown herewith, is particularly suited for placing the screws in the straps of shrapnel boxes. It may be fitted to drive, without change or adjustment, any three consecutive sizes flat or round head, or two sizes filister head, No. 6 to 14 inclusive, wood or machine screws, or three sizes flat or round head, or two sizes filister head machine screws up to No. 20. All the above up to 1½ inches long if smaller than No. 10, or up to 1¾ inches long, No. 10 or larger. Fitted with boring attachment if desired.

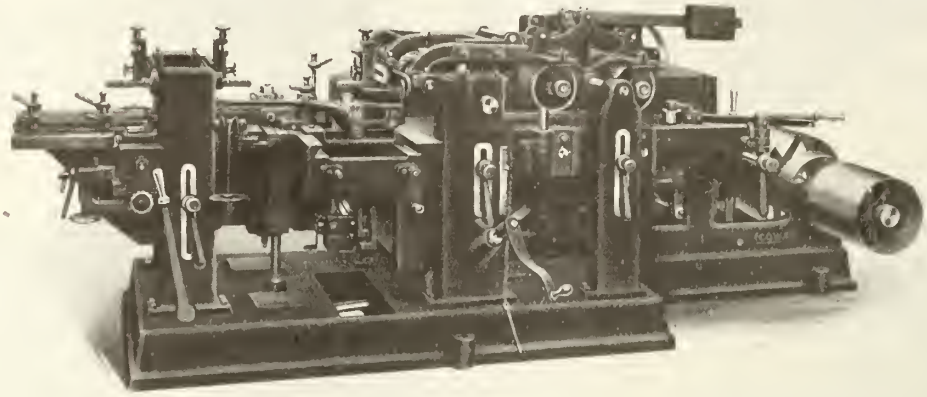
Many Machines in Use in Canada.

Ask for our Catalogue.

REYNOLDS PATTERN & MACHINE CO.

101 and 103 Third Ave., Moline, Ill., U.S.A.

Woodworking Machinery is our Specialty



12 Inch Moulder

AFTER years of personal experience with the requirements of Planing Mills and Furniture Factories, we are in a position to supply machinery adapted to your requirements, with individual motor drive when required.

Ask for Bulletin of Machines you are in need of

COWAN & COMPANY of GALT, Limited, Galt, Canada

Are Your Products Perkins Glued?

Ladies' Desk manufactured by The Jacques Furniture Co., Kitchener, Ont., in which Perkins Glue was used.

The live dealer realizes the value of selling his customers Perkins Glued products because they never come apart. Many of Canada's largest furniture factories use Perkins Vegetable Glue. It costs 20 per cent. less than hide glue, is applied cold, antiquating the obnoxious and wasteful cooking process, is absolutely uniform in quality and will not blister in sanding.

We will be glad to demonstrate in your own factory and on your own stock what can be accomplished with Perkins Vegetable Glue.

Write us today for more detailed information.

Perkins Glue Co.

Hamilton, Ont. Limited

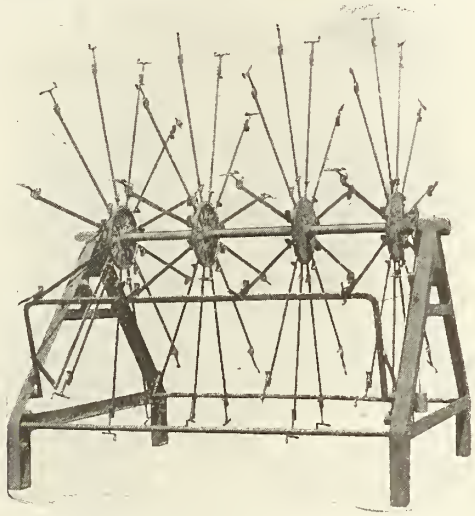
Address all inquiries to Sales Office, Perkins Glue Company, South Bend, Indiana, U. S. A.

The Falls No. 83 GLUE CLAMP CARRIER

is our latest offering to the woodworking world.

This Machine is designed to fill the requirements of plants of moderate production.

There is sufficient space between the clamps to allow the operator to hammer stock into place.



Buckling of stock is absolutely prevented by a simple method that appeals to the practical man.

This machine will save space, time and labor in your plant.

Let us explain why. Descriptive circular on request.

Manufactured by—

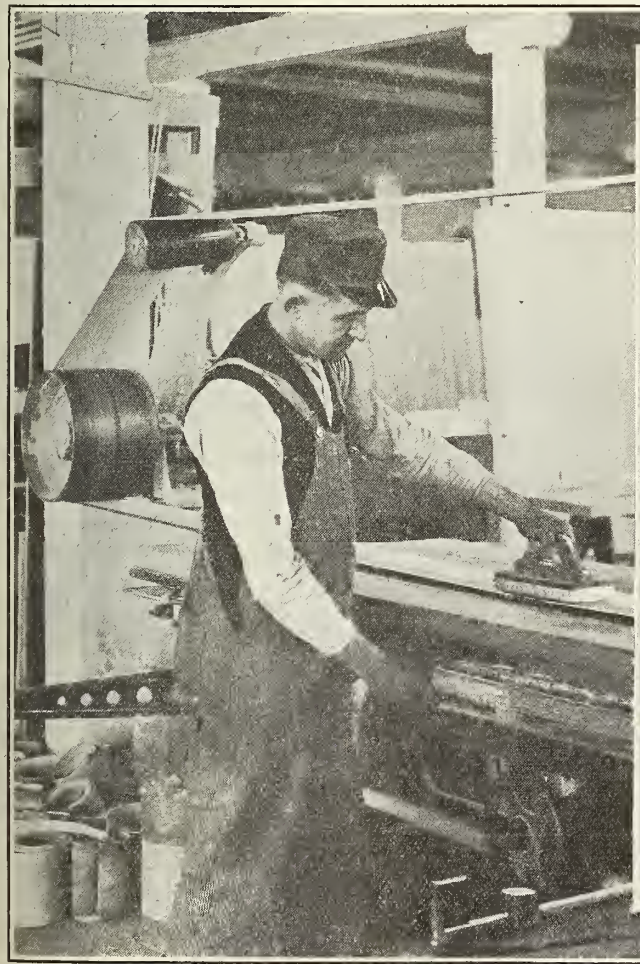
Falls Machine Co.

Sheboygan Falls - Wis., U.S.A.

Exclusive Canadian Representatives:

Garlock-Walker Machinery Co.

32 Front St. West - TORONTO, CANADA



Carborundum Brand Garnet Paper and Cloth are Uniformly Graded—Absolutely so

YOU can always depend upon Carborundum Brand Garnet products—they are uniformly coated with uniformly graded North River Garnet. ¶There is never any coarse grain to leave heavy deep scratches on the work. The paper or cloth will not fill because it is uniformly coated with free, clean cutting grain.

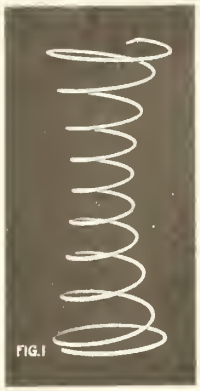
Carborundum Brand Garnet Products are Uniform—Absolutely so

May we send you sample sheets for trial?

THE CARBORUNDUM COMPANY

NIAGARA FALLS, N. Y.

NEW YORK CHICAGO PHILADELPHIA BOSTON CLEVELAND CINCINNATI PITTSBURGH GRAND RAPIDS MILWAUKEE



HIGH GRADE SPRINGS

for all kinds of Upholstery Work

Constructions for Chairs, Davenports, Carriages and Automobiles.

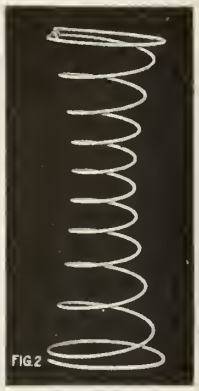
"Fosters" Multi-Springs and Luxury Springs

Spring Filling for Top Cushions

The service resulting from 30 years' experience is at your command.

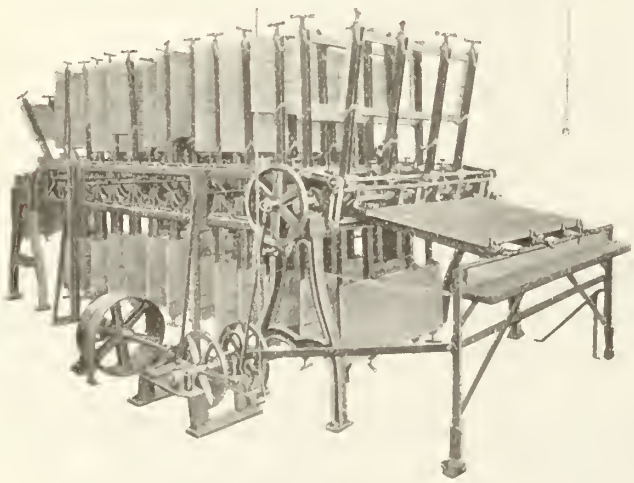
We solicit your inquiries and an opportunity to submit samples.

FOSTER BROS. MFG. CO., Utica, N.Y., U.S.A.



Billstrom

Glue Clamp Carrier



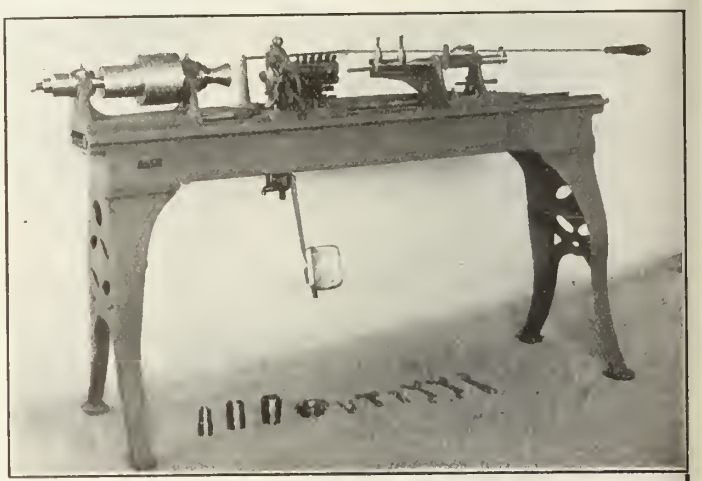
Here is a machine that will effect great savings in any plant where glued-up stock is handled.

It holds the edge glued stock securely until the glue is set. A glance at the above illustration tells the story.

ASK FOR LIST OF USERS.

Nels J. Billstrom, 2002 Ninth Street, ROCKFORD, ILL.

R. S. Pollard, Preston, Ont.



Cut the Cost of Production

by using the

WAYMOTH VARIETY WOOD-TURNING LATHE

Every feature incorporated in the lathe which makes for a little saving in the time of the operator, every item for his convenience that enables him to do better and more rapid work, assures just that much better service to the owner.

We would like to tell you about three special features of this lathe

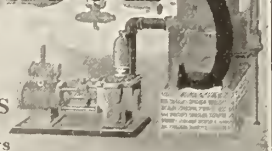
Our lathes are sold in Canada by

A. R. Williams Machinery Co., Toronto, Vancouver and Winnipeg.
General Supply Company of Canada, Ottawa.
Williams & Wilson, Montreal.

A. D. WAYMOTH & CO., FITCHBURG MASS.

Established in 1845.

DARLINGS STEAM APPLIANCES



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LIMITED
Engineers and Manufacturers
MONTREAL, CANADA

Branches: Toronto and Winnipeg
Agents: Halifax, St. John, Calgary, Vancouver

PRESSES

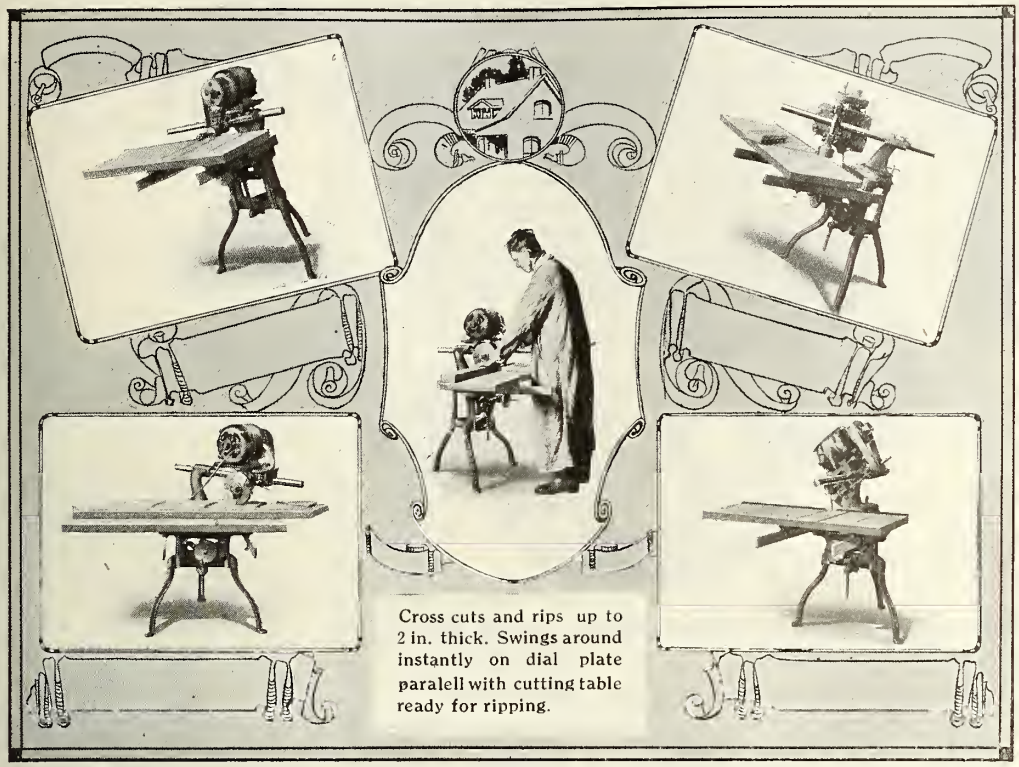
For Veneer and Veneer Drying

Made in Canada

William R. Perrin

Limited

Toronto



The Elliot Pony Woodworker

"The handiest machine in the shop."

Equipped with ½ h.p. motor which can be attached to any lamp socket.

It will cross cut, rip, rout stair stringers, dado, groove, bore, grind, etc., and is just as efficient as any machine in the factory.

For shaping and moulding it is unexcelled.

There is no factory or mill too large or too small to find a hundred uses for an Elliot.

Illustrations, prices and full particulars are yours for the asking.

Its portability, economy, efficiency and ever-readiness for any kind of work should appeal to manufacturers.

THE ELLIOT WOODWORKER, LIMITED College and Bathurst Streets, TORONTO

You save money by buying "Maple Leaf" Saws

"Maple Leaf" Grooving Saws

We make special shaped tooth Grooving Saws for special work, round face, bevel face, shear cut and straight face, etc. We manufacture Dado Heads, Mitre Saws, Novelty Saws, Special Tooth Grooving Saws, Rip and Cross-Cut Circular Saws, Concave Saws, Band Saws, Hand Saws, Cross-Cut Saws, etc., etc. Write for Catalogue.

Shurly-Dietrich Co., Limited, Galt, Canada Branches: Vancouver, B.C. and Hull, Que.

FURNITURE TRIMMINGS

New Designs in All Periods

Casters for all purposes

Write for samples and prices.

THE BURNS & BASSICK COMPANY, BRIDGEPORT, CONN., U.S.A.

You Have Paid for an Installation of

Chapman Double Ball Bearings

in Your Factory over and over again, BUT—

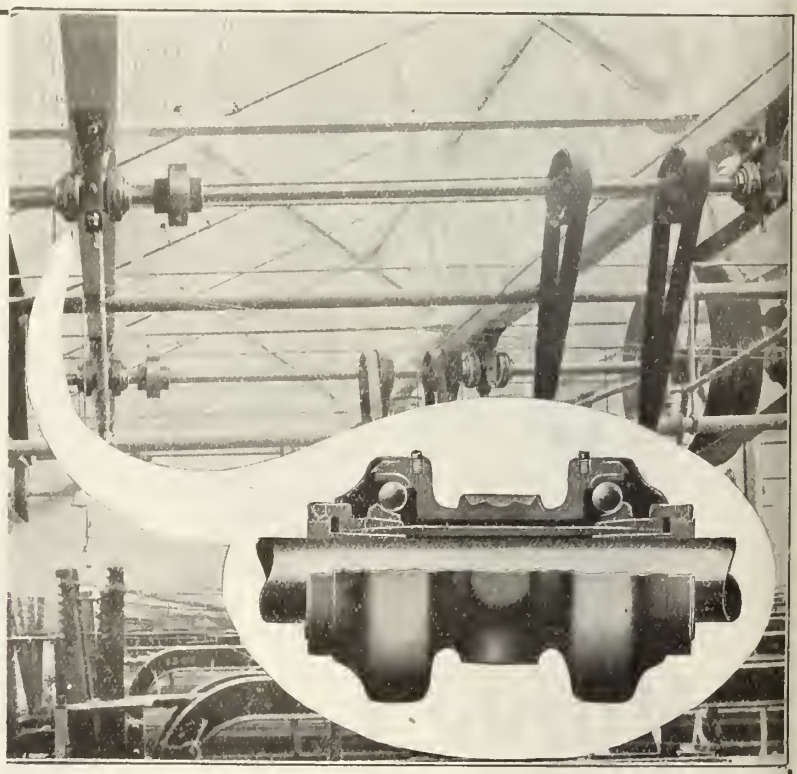
HAVE YOU GOT THEM ?

Ordinary line shafting wastes from 15 per cent. to 60 per cent. of power.

Line shafting equipped with Chapman Double Ball Bearings will eliminate about 75 per cent. of the friction, thus averaging a total saving of from 15 per cent. to 30 per cent.

Chapman Double Ball Bearings fit any adjustable hanger and require oiling and attention only once a year. No extra equipment required to install.

Write to-day for full particulars.



The Chapman Double Ball Bearing Co. of Canada, Limited

Toronto 339-351 Sorauren Ave. **Ontario**

American Branch: The Transmission Ball Bearing Co., Inc., 32 Wells St., Buffalo, N.Y.

FROST KING *"The Standard for Forty Years"* TROJAN

The Dependable Babbitt

Equally as good for heavy duty as speed. It is especially adapted for manufacturers of woodworking machinery, planing mills, furniture factories, box factories and woodworking plants.

Try it

Our High Grade Babbitt

Owing to its phenomenal ability to absorb oil "Trojan" babbitt will be found ideal for overhead bearings in line and counter-shafts as it is unnecessary to oil as often as with the ordinary babbitts.

Try it

HOYT METAL COMPANY - Toronto, Ont.

NEW YORK ST. LOUIS LONDON, ENG.

Morehead

Back to Boiler SYSTEM

Rejuvenate Your Steam Plant

by making the inexpensive "Morehead" System a part of it.

Save fuel by bringing the pure condensation directly back to the boilers HOT!

Save repairs by eliminating for ever the necessity for the wasteful and constantly out-of-order steam pump.

The simple, easily installed "Morehead" System will much more than pay for itself the first year of use.

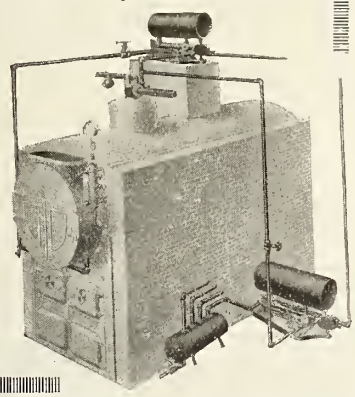
The Morehead Book shows actual photographs of interesting installations. Write for your copy now.

Canadian Morehead Manufacturing Company
DEPT. H
WOODSTOCK, ONTARIO

They Saved 25% in Fuel and 50% in Repairs—

So writes Mr. William H. Turner, Secretary and Treasurer of the Easton Furniture Company, of Easton, Md., after giving the "Morehead" System a thorough trial.

Until you are draining the condensation from your kilns and returning it—every drop—to the boilers at the original temperature—you are wasting heat units that cost you DOLLARS to produce.



GRAND RAPIDS VAPOR DRY KILN

GRAND RAPIDS MICHIGAN

Increasing output of other kilns is part of our business.

We can arrange to utilize your present equipment and supplement with sufficient additional to bring your kilns to our basis of output.

We would suggest that you supply our engineering department with description of your kilns and lumber drying needs, so we can understandingly outline what can be done.

Your opening the matter will incur no obligation and we will give you, frankly, the results of our experience.

BOOKS FOR SALE

The following books are offered at special prices subject to previous sale:

Cabinet Making, by J. H. Rudd. Published by Grand Rapids Furniture Record Company. 210 pages, illustrated. Price $1.50.

Saw Fitting Manual, a treatise on the care of saws and knives. Deals with everything in the saw and knife alphabet, from adjustments to widths. 144 pages. Price $2.00.

Common-sense Handrailing, by Fred T. Hodgson. Published by Frederick J. Drake & Company, Chicago. 114 pages, illustrated. Price 50c.

Roof Framing Made Easy, by Owen B. Maginnis. Published by The Industrial Publication Company, New York. 164 pages, illustrated. Price 50c.

"Carpentry," by Ira S. Griffith. Published in 1916 by The Manual Arts Press. 188 pages, illustrated. Price $1.00.

Handrailing Simplified, by An Experienced Architect. Published by William T. Comstock, New York. 52 pages, illustrated. Price 50c.

How to Join Mouldings; or, The Arts of Mitering and Coping, by Owen B. Maginnis. Published by William T. Comstock, New York. 72 pages, illustrated. Price 50c.

Utilization of Wood-Waste (Second Revised Edition), by Ernst Hubbard. Published in 1915 by Scott, Greenwood & Sons. 192 pages, illustrated. Price $1.50.

Woodworker Publishing Company, Limited

345 Adelaide Street West, Toronto, Ontario

The "Canadian Woodworker" Buyers' Directory

An Index to the Best Equipment and Supplies

ABRASIVES
The Carborundum Co., Niagara Falls, N.Y.

AIR BRUSH EQUIPMENT
DeVilbiss Mfg. Co., Toledo, Ohio.

ANNUNCIATORS
Signal Systems, Limited, Toronto, Ont.

BABBITT METAL
Canada Metal Company, Toronto, Ont.
Hoyt Metal Co., Toronto.

BALL BEARINGS
Chapman Double Ball Bearing Co., Toronto.

BALUSTER LATHES
Garlock Walker Machinery Co., Toronto, Ont.
Mattison Machine Works, C., Beloit, Wis.
Whitney & Son, Baxter D., Winchendon, Mass.

BAND SAW FILING MACHINERY
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

BAND SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

BAND SAW MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

BAND SAW STRETCHERS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Machinery Co. of America, Grand Rapids, Mich.
Yates Machine Co., P. B., Hamilton, Ont.

BENDING MACHINES
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Perfection Wood Steaming Retort Company, Parkersburg, W. Va.

BELLS, ELECTRIC
Signal Systems, Limited, Toronto, Ont.

BELTING
Fay & Egan Co., J. A., Cincinnati, Ohio.

BENCH PLANERS
Wallace & Co., J. D., Chicago, Ill.

BLOWERS
Sheldons, Limited, Galt, Ont.

BLOW PIPING
Sheldons, Limited, Galt, Ont.

BOILER COMPOUND
Beveridge Paper Company, Montreal, Que.

BORING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mereen-Johnson Mach. Co., Minneapolis, Minn.
Nash, J. M., Milwaukee, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Reynolds Pattern & Machine Co., Moline, Ill.
Yates Machine Co., P. B., Hamilton, Ont.

BOX MAKERS' MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mereen-Johnson Machine Company, Minneapolis, Minn.
Neilson & Company, J. L. Winnipeg, Man.
Preston Woodworking Machinery Company, Preston, Ont.
Reynolds Pattern & Machine Co., Moline, Ill.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

CABINET PLANERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

CARRIER SYSTEMS
Canadian Mathews-Gravity Carrier Company, Toronto, Ont.

CARS (Transfer)
Sheldons, Limited, Galt, Ont.

CARBORUNDUM PAPER
Carborundum Co., Niagara Falls, N.Y.

CARVING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

CASTERS
Burns & Bassick Co., Bridgeport, Conn.
Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.

CLAMPS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Neilson & Company, J. L., Winnipeg, Man.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Company, Montreal, P.Q.

COLUMN MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

CORRUGATED FASTENERS
Acme Steel Goods Company of Canada, Ltd.

CRATING LUMBER
Read Bros., Limited, Toronto.

CUSTOMS TURNINGS
Galbraith & Co., Ltd., Owen Sound, Ont.

CUT-OFF SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, Que.
Yates Machine Co., P. B., Hamilton, Ont.

CUTTER HEADS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, Beloit, Wis.
Shimer Cutter Head Co., Galt, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

DOVETAILING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

DOWEL MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

DRY KILNS
Grand Rapids Veneer Works, Grand Rapids, Mich.
National Dry Kiln Co., Indianapolis, Ind.
Sheldons, Limited, Galt, Ont.

DUST COLLECTORS
Sheldons, Limited, Galt, Ont.

DUST SEPARATORS
Sheldons, Limited, Galt, Ont.

EDGERS (Single Saw)
Canada Machinery Corporation, Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont
Simonds Canada Saw Co., Montreal, Que.

EDGERS (Gang)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

END MATCHING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

EXHAUST FANS
Garlock-Walker Machinery Co., Toronto, Ont.
Sheldons Limited, Galt, Ont.

FEED ATTACHMENTS
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.

FILES
Simonds Canada Saw Co., Montreal, Que.

FLOORING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

FLUTING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.

FLUTING AND TWIST MACHINE
Preston Woodworking Machinery Company, Preston, Ont.

FURNITURE CARVINGS
Decorators Supply Co., Chicago, Ill.

FURNITURE TRIMMINGS
Burns & Bassick Co., Bridgeport, Conn.
Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.

GARNET PAPER AND CLOTH
The Carborundum Co., Niagara Falls, N.Y.
Ritchey Supply Company, Toronto, Ont.

GRAINING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Yates Machine Co., P. B., Hamilton, Ont.

The Babbitt Metal that's at the Front in Efficiency and Economy

HARRIS HEAVY PRESSURE

"The Babbitt Metal Without a Fault" is guaranteed to give EXCELLENT SERVICE. It will not crack or squeeze out. It will run cool at any speed. It is copper coated and copper hardened. It is best for all general machinery bearings. Order a box from our nearest factory.

It is Made in Canada. **What We Make We Guarantee.**

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THE CANADA METAL COMPANY, LIMITED

Head office and Factory **TORONTO** **Fraser Avenue**

Branch Factories:— **HAMILTON** **MONTREAL** **WINNIPEG** **VANCOUVER**

Why Not Roll Your Lumber from Kiln to Storage or to the Machines on Mathews Ball-Bearing Roller Conveyers?

Designed primarily for conveying Lumber and Wood Stock used by

WAGON AND AUTOMOBILE MFRS.
PIANO MFRS. FURNITURE MFRS.
COFFIN MFRS. BOX AND SHOOK MFRS.
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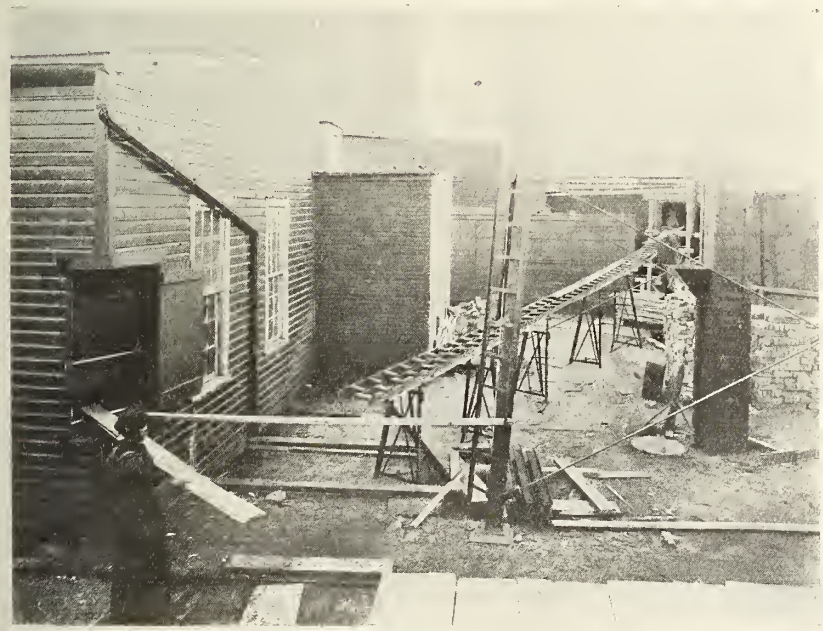

Lumber Conveyer will handle all widths and lengths of dimension stuff, planks, R.R. ties, etc.

Write for Bulletin No. 1

Manufactured Exclusively by the

CANADIAN MATHEWS GRAVITY CARRIER CO., Limited - 484 Richmond St. West . TORONTO

"Canadian Woodworker" Buyers' Directory—Continued

GLUE
Perkins Glue Company, South Bend, Ind.

GLUE CLAMPS
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Neilson & Company, J. L., Winnipeg.

GLUE HEATERS
Fay & Egan Co., J. A., Cincinnati, Ohio
International Electric Co., Indianapolis, Ind.
Jackson, Cochrane & Company, Kitchener, Ont

GLUE JOINTERS
Canada Machinery Corporation, Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Yates Machine Co., P. B., Hamilton, Ont

GLUE SPREADERS
Fay & Egan Co., J. A., Cincinnati, Ohio
Jackson, Cochrane & Company, Kitchener, Ont

GLUE ROOM EQUIPMENT
Billstrom, Nels. J., Rockford, Ill.
Perrin & Company, W. R., Toronto, Ont

GRAVITY CARRIERS
Canadian Mathews Gravity Carrier Co.

GRINDERS (Cutter)
Fay & Egan Co., J. A., Cincinnati, Ohio
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.

GRINDERS, HAND AND FOOT POWER
The Carborundum Co., Niagara Falls, N.Y.

GRINDERS (Knife)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

GRINDERS (Tool)
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Kitchener, Ont

GRINDING WHEELS
The Carborundum Co., Niagara Falls, N.Y.

GROOVING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio
Mattison Machine Works, C., Beloit, Wis.

GUARDS
Gustafson & Scott Mfg. Co., Chicago, Ill.

GUM LUMBER
Anderson-Tully Co., Memphis, Tenn.
Brown & Co., George C., Memphis, Tenn.
Churchill-Milton Lumber Co., Louisville, Ky.
Hyde Lumber Company, South Bend, Ind.
Penrod, Jurden & McCowen, Memphis, Tenn.
Thomas & Proetz Lumber Co., St. Louis, Mo.

GUMMERS, ETC.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Machinery Co. of America, Grand Rapids, Mich.

HAND PROTECTORS
Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND SCREWS
Fay & Egan Co., J. A., Cincinnati, Ohio.

HANDLE & SPOKE MACHINERY
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Whitney & Son, Baxter D., Winchendon, Mass.

HARDWARE
Burns & Bassick Co., Bridgeport, Conn.
Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.
Yokes Hardware Co., Toronto.
Weber-Knapp Co., Jamestown, N.Y.

HARDWOOD LUMBER
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American Hardwood Lumber Co., St. Louis, Mo.
American Oak Mfrs.' Assn., Memphis, Tenn.
Anderson-Tully Co., Memphis, Tenn.
Atlantic Lumber Company, Toronto.
Banning, Leland G., Cincinnati, Ohio.
Brown & Company, Geo. C., Memphis, Tenn.
Burns & Knapp Lumber Co., Conneautville, Pa.
Churchill-Milton Lumber Co., Louisville, Ky.
Clark & Son, Edward, Toronto, Ont.
Dermott Land & Lumber Co., Chicago, Ill.
Graves, Bigwood Company, Toronto, Ont.
Kersley, Geo., Montreal, Que.
Korn-Conkling Co., Cincinnati, Ohio.
Martin-Barriss Co., Cleveland, Ohio.
Paepcke Leicht Lumber Co., Chicago, Ill.
Payson Smith Lumber Co., Minneapolis, Minn.
Pickrel Walnut Co., St. Louis, Mo.
Probst Lumber Co., Cincinnati, Ohio.
Read Bros., Limited, Toronto.
Spencer, C. A., Montreal, Que.

HUB MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
Perrin & Company, Wm. R., Toronto, Ont.

JOINTERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

KNIVES (Planer and others)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

LATHES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Defiance Machine Works.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass

LUMBER
Aberdeen Lumber Co., Pittsburg, Pa.
Acme Veneer & Lumber Co., Cincinnati, Ohio.
American Hardwood Lumber Co., St. Louis, Mo.
Anderson-Tully Co., Memphis, Tenn.
Banning, Leland G., Cincinnati, Ohio.
B. C. Lumber Commissioner, Toronto.
Brown & Company, Geo. C., Memphis, Tenn.
Churchill, Milton Lumber Co., Louisville, Ky.
Clark & Son, Edward, Toronto, Ont.
Dermott Land & Lumber Co., Chicago, Ill.
Dominion Mahogany & Veneer Co., Montreal,
Graves, Bigwood Company, Toronto, Ont.
Hartzell, Geo. W., Piqua, Ohio.
Huddleston, Marsh Mahogany Co., New York.
Korn-Conkling Company, Cincinnati, Ohio.
Long-Knight Lumber Co., Indianapolis.
Paepcke Leicht Lumber Company, Chicago, Ill.
Payson Smith Lumber Co., Minneapolis, Minn.
Pickrel Walnut Co., St. Louis, Mo.
Probst Lumber Co., Cincinnati, Ohio.
Read Bros., Limited, Toronto.
Stinson & Co., J. V., Owensboro, Ky.

MACHINE KNIVES
Canada Machinery Corporation, Galt, Ont.
Peter Hay Knife Company, Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

MITRE MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

MITRE SAWS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Simonds Canada Saw Co., Montreal, P.Q.

MULTIPLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Reynolds Pattern & Machine Co., Moline, Ill.

PANELS
Wactjen & Co., George L., Milwaukee, Wis.

PATTERN SHOP MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass
Yates Machine Co., P. B., Hamilton, Ont.

PLANERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Wallace & Company, Chicago, Ill.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PLANING MILL MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont
Mattison Machine Works, C., Beloit, Wis.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PRESSES (Veneer)
Canada Machinery Corporation, Galt, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Perrin & Co., Wm. R., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.

PULLEYS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Machinery Co. of America, Grand Rapids, Mich.

RED GUM LUMBER
Gum Lumber Manufacturers' Association.

RECORDERS (TIME)
International Time Recording Co., Toronto, Ont.
Signal Systems, Limited, Toronto, Ont.

RESAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

RIM AND FELLOE MACHINERY
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.

RIP SAWING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Sinker-Davis Company, Indianapolis, Ind.
Yates Machine Co., P. B., Hamilton, Ont.

Are Your Methods Ancient or Modern?

Greater work capacity with much less effort. Time saving and uniform work are features that should interest you.

THE WALLACE BENCH-PLANER

operates from electric light socket; weighs only 50 pounds. Length, 18 inches. Knives, 4 inches.

Write for our proposition.

J. D. WALLACE & CO.

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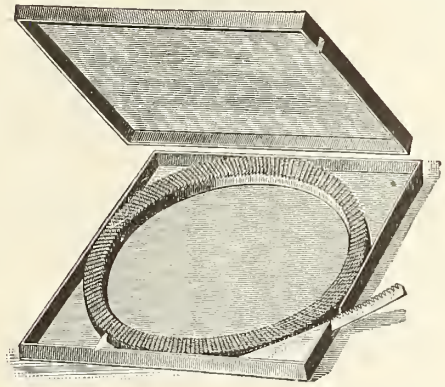
NARROW BAND SAWS

Narrow Band Saws are furnished set and filed—NOT JOINED.



Give full particulars when ordering.

RADCLIFF Narrow Bandsaws are made of best quality Swedish steel. They are extremely tough temper and will hold their edge much longer each filing, than other makes.

Bandsaws for cutting Brass, Iron, Steel can be supplied from stock.

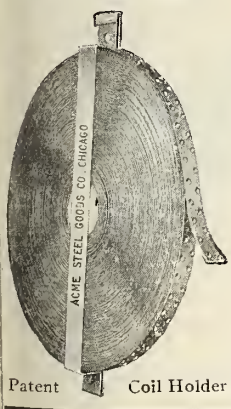
Large stock for quick delivery always on hand.

Radcliff Saw Manufacturing Company, Limited

TORONTO 550 Dundas Street, ONTARIO

Agents for L. & I. J. White Co., Machine Knives

"DOT EMBOSSED" 300 Foot Coil



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STEEL BOX STRAPPING

SMOOTH EDGES—CONTINUOUS LENGTHS
COIL HOLDERS SUPPLIED
LACQUERED—GALVANIZED——BRIGHT

Write now for Catalog.

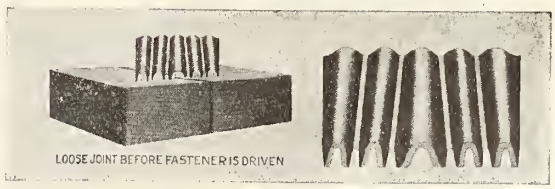
ACME STEEL GOODS CO.
OF CANADA, LIMITED
20 St. Nicholas St. MONTREAL, Que.

Corrugated Joint Fasteners

In bulk in Barrels and Boxes.

In coils for Automatic Driving Machines.

PARALLEL SAW EDGE



DIVERGENT SAW EDGE

"Canadian Woodworker" Buyers' Directory—Continued

SANDERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Nash, J. M., Milwaukee, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SASH, DOOR & BLIND MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SAWS
Atkins & Co., E. C., Indianapolis, Ind.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Radcliff Saw Mfg. Company, Toronto, Ont.
Shurly-Dietrich, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Smith Co., Ltd., R. H., St. Catharines, Ont.

SAW GUMMERS, ALOXITE
The Carborundum Co., Niagara Falls, N.Y.

SAW SWAGES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Machinery Co. of America, Grand Rapids, Mich.
Simonds Canada Saw Co., Montreal, Que.

SAW TABLES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SCRAPING MACHINES
Canada Machinery Corporation, Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass

SCREW DRIVING MACHINERY
Canada Machinery Corporation, Galt, Ont.
Reynolds Pattern & Machine Works, Moline, Ill.

SCROLL SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

SECOND-HAND MACHINERY
Cowan & Co., Galt, Ont.
Petrie, H. W
Wayne Machinery Co., Fort Wayne, Ind.

SHAPERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Whitney & Sons, Baxter D., Winchendon, Mass
Yates Machine Co., P. B., Hamilton, Ont.

SHARPENING TOOLS
The Carborundum Co., Niagara Falls, N.Y.

SHAVING COLLECTORS
Sheldons Limited, Galt, Ont.

SHOOK BUNDLER
Neilson & Company, J. L. Winnipeg, Man.

SPRINGS FOR UPHOLSTERY
Foster Bros. Mfg. Co., Utica, N.Y.

STAINS
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.
Schmidt, Walter K., Grand Rapids, Mich.

STEAM APPLIANCES
Cole Company, Geo. W., Toronto, Ont.
Darling Bros., Montreal.
Morrison Brass Mfg. Co., Toronto, Ont.

SINGLE SPINDLE BOXING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

STAVE SAWING MACHINE
Whitney & Sons, Baxter D., Winchendon, Mass

STEAM TRAPS
Canadian Morehead Mfg. Co., Woodstock, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

STEEL BOX STRAPPING
Acme Steel Goods Co. of Canada, Ltd.

STEEL SHELL BOX BANDS
Acme Steel Goods Co. of Canada, Ltd.

SURFACERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

SWING SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

TABLE LEG LATHES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Mattison Machine Works, C., Beloit, Wis.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

TABLE SLIDES
Walter & Co., B., Wabash, Ind.

TENONING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

TRANSMISSION MACHINERY
Dodge Mfg. Co., Ltd., Toronto, Ont.

TELEPHONES—PRIVATE SYSTEMS
Signal Systems, Limited, Toronto, Ont.

TRIMMERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

TRUCKS
Sheldons Limited, Galt, Ont.
National Dry Kiln Co., Indianapolis, Ind.

TURNING MACHINES
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Mattison Machine Works, C., Beloit, Wis.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

UNDER-CUT SELF-FEEDING FACE PLANER
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

VARNISHES
Ault & Wiborg Company, Toronto, Ont.

VARNISH SPRAYERS
DeVilbiss Mfg. Co., Toledo, Ohio.

VENEERS
Acme Veneer & Lumber Co., Cincinnati, Ohio.
Barnaby, Chas. A., Greencastle, Ind.
Central Veneer Co., Huntington, W. Virginia
Clark Veneer Co., Walter, Grand Rapids, Mich.
Dominion Mahogany & Veneer Company, Montreal, Que.
Empire Veneer Company, Chicago, Ill.
Hartzell, Geo. W., Piqua, Ohio.
Haughton Veneer Company, Chicago, Ill.
Hoffman Bros. Company, Fort Wayne, Ind.
Geo. Kersley, Montreal, Que.
Nartzik, J. J., Chicago, Ill.
Ohio Veneer Company, Cincinnati, Ohio.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Roberts Veneer Co., New Albany, Ind.
Toronto Veneer Company, Toronto, Ont.
Waetjen & Co., George L., Milwaukee, Wis.

VENEER TAPE
Ideal Coated Paper Co., Brookfield, Mass.

VENTILATING APPARATUS
Sheldons Limited, Galt, Ont.

VENEER JOINTERS
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.

VENEER PRESSES (Hand and Power)
Canada Machinery Corporation, Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Perrin & Company, Wm. R., Toronto, Ont.

VISES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Company, Montreal, Que.

WAGON AND CARRIAGE MACHINERY
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass
Yates Machine Co., P. B., Hamilton, Ont.

WATCHMAN'S CLOCKS
Signal Systems, Limited, Toronto, Ont.

WOOD FINISHES
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

WOOD PULLEYS
Dodge Mfg. Co., Ltd., Toronto, Ont.

WOOD TURNING MACHINERY
Canada Machinery Corporation, Galt, Ont.
Defiance Machine Works, Defiance, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Waymoth & Co., A. D., Fitchburg, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

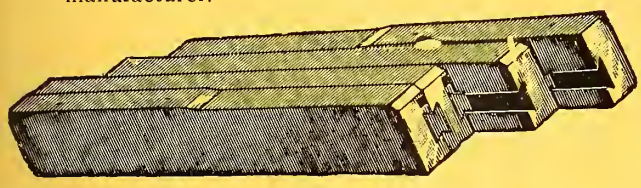
WORK BENCHES
Fay & Egan Co., J. A., Cincinnati, Ohio.

WOODWORKING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Elliot Woodworker Limited, Toronto, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Reynolds Pattern & Machine Works, Moline, Ill.

WHEELS, Grinding, Carborundum and Aloxite
The Carborundum Co., Niagara Falls, N.Y.

Making TABLE-SLIDES is a Specialty Business

For more than TWENTY-FIVE YEARS we have made TABLE SLIDES exclusively. Our Factory is equipped with Special Machinery which enables us to make SLIDES,—BETTER and CHEAPER than the furniture manufacturer.



Canadian Table makers are rapidly adopting WABASH SLIDES

Because { They ELIMINATE SLIDE TROUBLES / Are CHEAPER and BETTER

Reduced Costs / **Increased Out-put** { BY USING **WABASH SLIDES**

MADE BY

B. Walter & Company

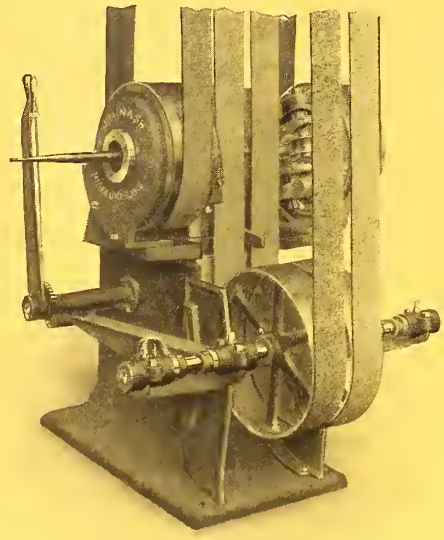
Wabash, Ind.

The Largest EXCLUSIVE TABLE-SLIDE Manufacturers in America

ESTABLISHED-1887

The Big SAVING

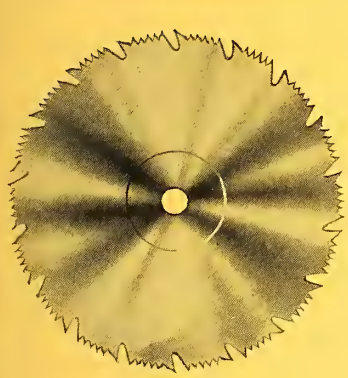
IN SANDING ROUND WORK



is not the only good feature of the Nash Sander. The quality of the work done is of the highest.

Did you ever consider this sander for your work?

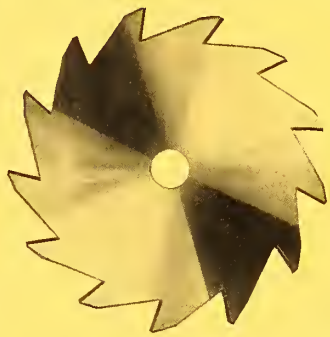
J. M. NASH, MILWAUKEE, Wis.



ATKINS

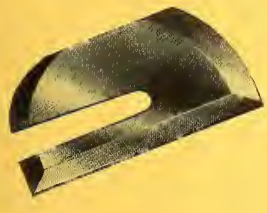
STERLING QUALITY

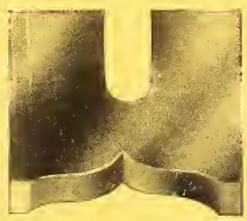
SAWS and KNIVES



The best steel—the most careful and accurate workmanship—the equipment that will eventually save you money.

Atkins Sterling Quality Saws and Knives are proving their superiority by competitive tests in the largest plants of the country. We welcome your most careful investigation, as we know the satisfaction that will result.





Write to-day for our Knife Booklet "C W" and Pattern Template Paper.

E. C. ATKINS & CO.

Makers of Sterling Saws

Factory—HAMILTON, Ont. **Vancouver Branch—109 Powell Street**

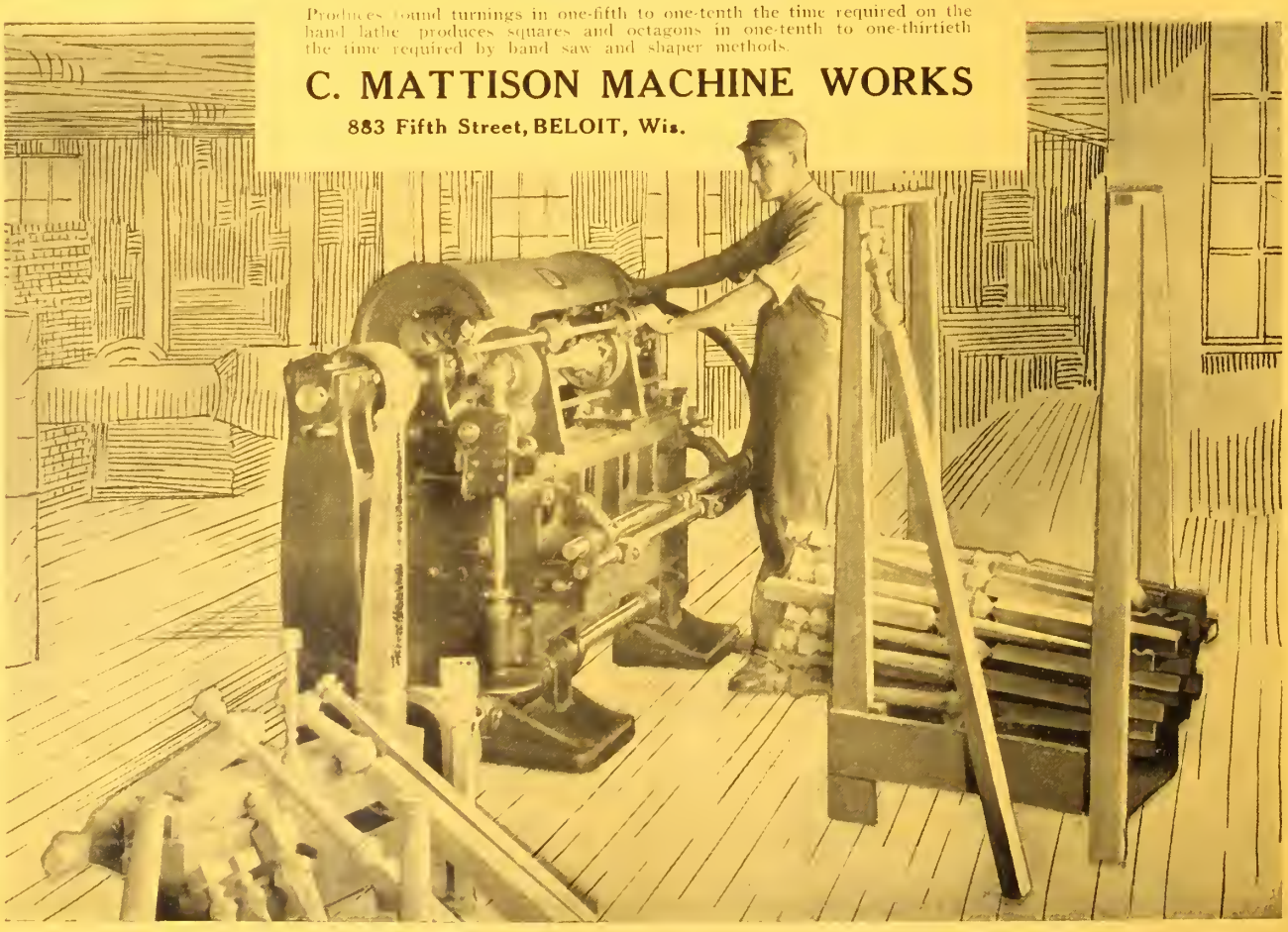
Conserve Your Man-Power

Right now, more than ever before, the big problem is to make each man produce more—and Labor-saving Machinery is the only solution.

MATTISON
Automatic
The Standard Shaping Lathe
OVER 2000 IN USE

Produces round turnings in one-fifth to one-tenth the time required on the hand lathe, produces squares and octagons in one-tenth to one-thirtieth the time required by band saw and shaper methods.

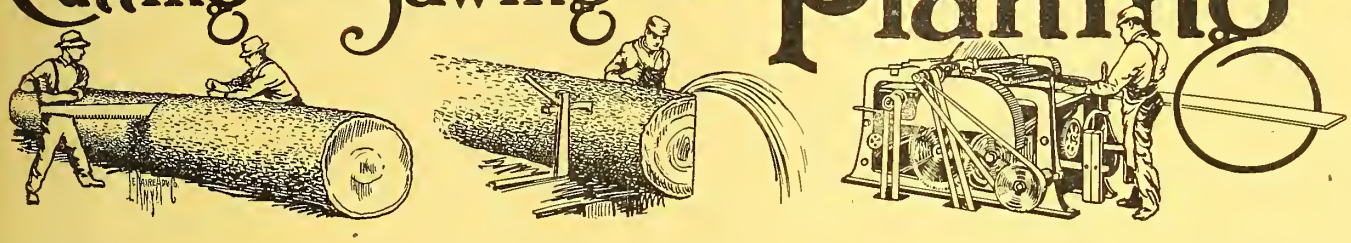
C. MATTISON MACHINE WORKS
883 Fifth Street, BELOIT, Wis.



Volume Seventeen TORONTO, JUNE, 1917 Number Six

CANADIAN WOODWORKER and Furniture Manufacturer

Cutting — Sawing — Planing



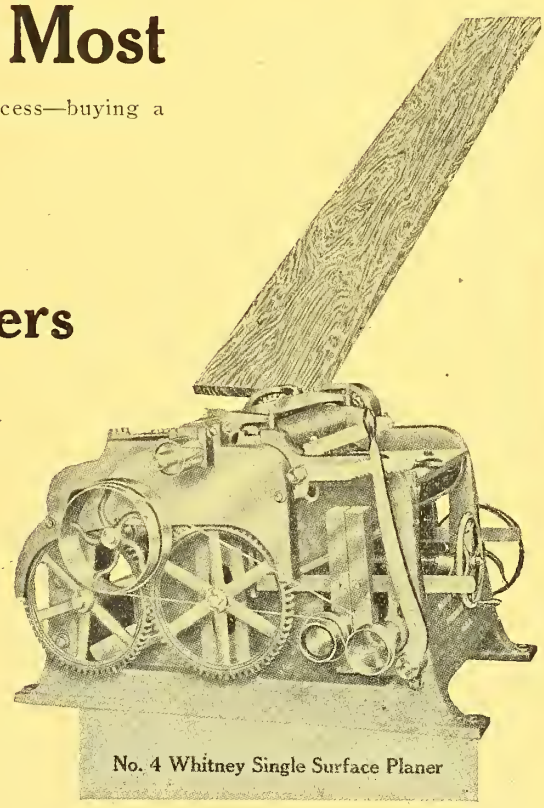
The Planing Counts Most

A planer that does its duty often swings the business up to success—buying a planer merits your deep study.

Fully and frankly, we tell you about

Whitney Planers
Single and Double Surfacers

We detail the reasons why the installation of a Whitney will increase the volume of your planing output and better the quality—why the upkeep and operation costs are carried down to the lowest possible notch—how Whitney Planers stand up sturdily to the hardest kind of day-by-day service—we also suggest the most efficient equipment for your work of square cylinders and two or four ordinary knives or round cylinders and four thin high-speed steel knives and jointing, grinding and setting devices.



No. 4 Whitney Single Surface Planer

Just write us a line.

Notice how Whitney Planers are found in wood-working shops that are considered representative.

BAXTER D. WHITNEY & SON, Winchendon, Mass.

H. H. Plummer & Co.
451-453 Monadnock Bldg.,
San Francisco, Cal.

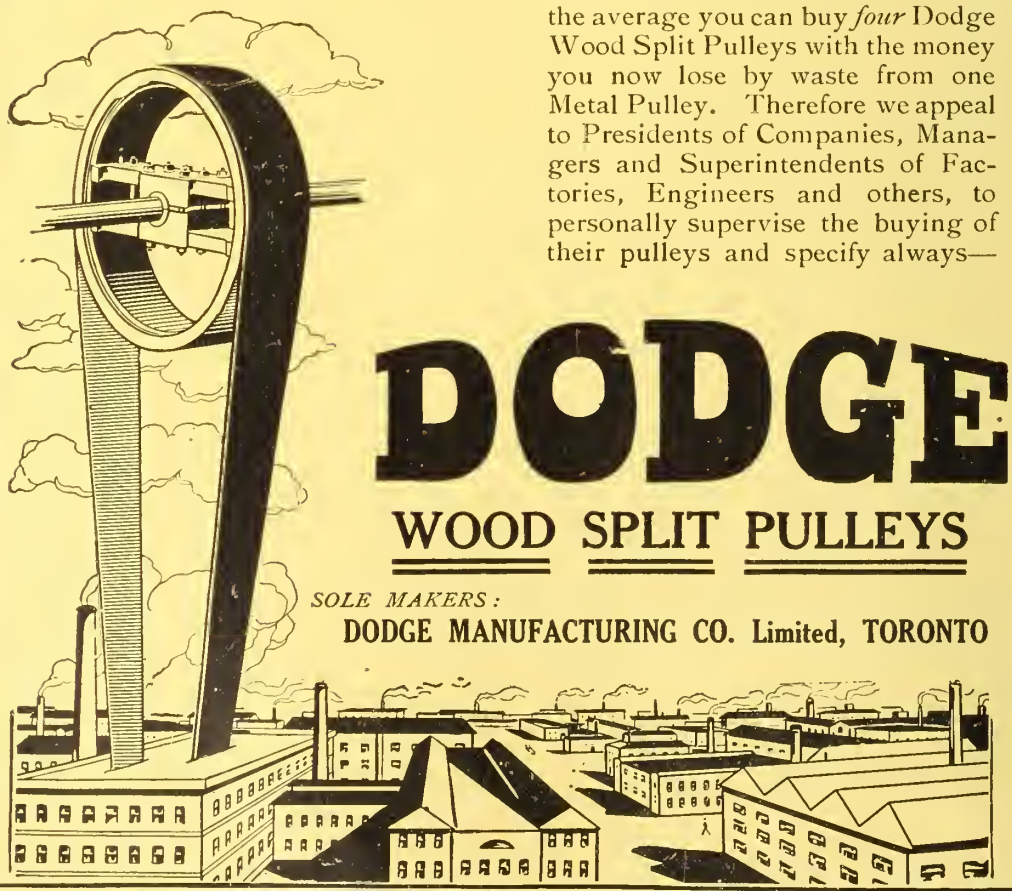
Canadian Representatives:
H. W. Petrie, Limited,
Toronto, Ontario

B. C. Woods in Woodworking Industries

That grim spectre—

RELENTLESS and ever present in Factory operation is the spectre of Overhead Charges.

Its ravages among the profits of your business must be constantly checked. One of its most active lieutenants is *Power Wastage* —caused by belt slippage over metal pulleys. Many thousands of dollars are wasted yearly in Canadian Factories and workshops where Wood Pulleys would save 50% of the waste.



Actual scientific tests show that on the average you can buy *four* Dodge Wood Split Pulleys with the money you now lose by waste from one Metal Pulley. Therefore we appeal to Presidents of Companies, Managers and Superintendents of Factories, Engineers and others, to personally supervise the buying of their pulleys and specify always—

DODGE

WOOD SPLIT PULLEYS

SOLE MAKERS:

DODGE MANUFACTURING CO. Limited, TORONTO

5

GARLOCK-WALKER MACHINERY CO. LIMITED

32 FRONT ST. WEST, TORONTO TELEPHONE MAIN 5346

Labor-Saving and Time-Saving Machinery

In all woodworking plants, under present conditions, up-to-the-minute LABOR-SAVING and TIME-SAVING machinery is an absolute necessity from a profitable business standpoint.

In no other way can the manufacturer so readily reduce the cost of his product without detracting from its quality.

We will on request, without obligation on your part, send cuts and descriptions of the latest improved machines for any operation. They give information that will be valuable for your files.

A List of Our Leading Woodworking Machines:

Band Resaws.
Band Rip Saws.
Band Edging and Ripping Machines.
Band Scroll Saws.
Bevel Band Saws.
Box Board Matchers.
Buzz Planers.
Box Machinery.
Boring Machines, Horizontal or Vertical, Single or Multiple Spindle.
Carving Machines.
Circular Saws, Rip and Cross Cut.
Combination Saws.
Cut-off Saws.
Dado or Grooving Machines.
Dovetailers.
Drum Sanders.
Endless Bed Sanders.
Furniture Graining Machines.
Filing and Setting Machines.
Gang Edgers and Rippers.
Glue Jointers.
Automatic Gang Rip Saws.
Hardwood Flooring Outfits.
Jointers, Power and Hand Feed.
Knife Grinders.
Lathes — Back Knife, Manual Training, Pattern Makers'.
Lath Mills and Bolters.
Lumber Registers.
Mitre Machines.
Mortisers — Hollow Chisel, Vertical or Horizontal.
Moulders—Inside or Outside.
Nailing Machines.
Planers—Endless Bed.
Planers and Matchers, light
Planers and Matchers, Fast Feed.
Rod and Dowel Machines.
Sanders, Drum, Disc, etc.
Shapers, Single and Double Spindle, with Babbit, Bronze, or Ball Bearings.
Sash and Door Outfits.
Screw Driving Machines.
Surfacers, Single or Double.
Swing Saws.
Timber Sizers.
Tenoners, Single or Double End.
Veneer Presses.
Variety Lathes.
Veneer Jointers.
Universal Saw Benches.
Wood Turning Lathes.

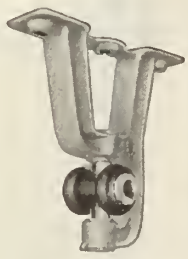
"EVERYTHING IN WOODWORKING MACHINERY."

Garlock-Walker Machinery Company, Limited

32 Front Street West, Toronto

METAL and WOODWORKING MACHINERY of all Kinds

What They Say



BERLIN MACHINE WORKS LIMITED

P. D. YATES, PRES. & GEN'L MGR
L.D. FORBES, TREAS
O.W. ROBINSON, SEC

FACTORIES HAMILTON, CANADA BELOIT, WIS. U.S.A.

GENERAL OFFICES HAMILTON, CANADA.

CABLE ADDRESS "BERWORKS" A.B.C. 5TH. LIEBERS

Hamilton, Ont., Feb. 26, 1916.

Transmission Ballbearing Co.,
32 Wells St.,
Buffalo, N. Y.

Gentlemen:-

In 1907 we equipped our plant with the Chapman ballbearings for line shaft, and found them perfectly satisfactory in every way. We shortly afterwards commenced using their ballbearings for the loose pulley drives on the machines that we manufacture, and have taken them into account in our heaviest drives, and do not know to this writing of any instance where this particular style of loose pulley has not given complete satisfaction.

Yours truly,

GR/MM BERLIN MACHINE WORKS LIMITED.

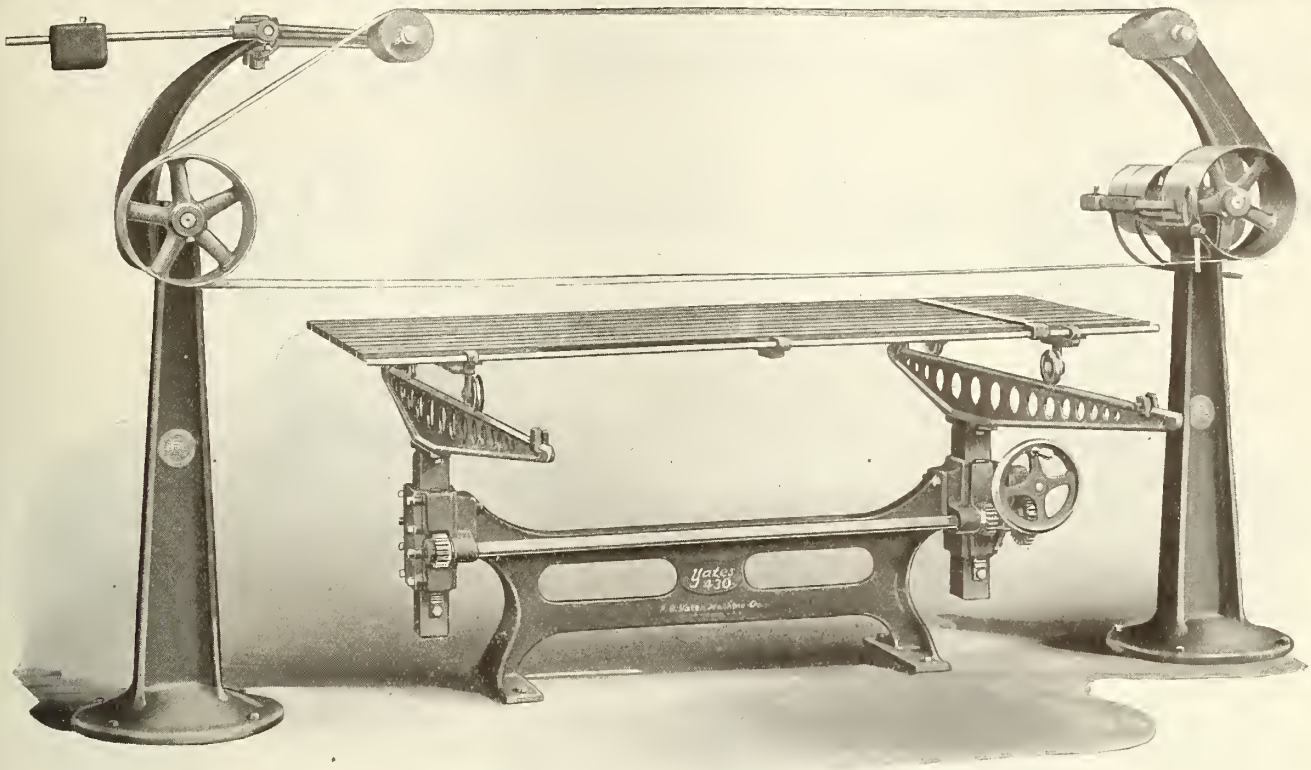
Chapman Double Ball Bearings

have been installed in over 3000 factories of all classes during the past fifteen years, and the above letter is one of many of a similar import, bearing testimony to the efficiency, long life, and cleanliness of the bearing. Some of these have been compiled in a booklet, "Results", which we will be pleased to send on request.

Chapman Double Ball Bearing Co., Ltd.

337-351 Sorauren Avenue, TORONTO

Transmission Ball Bearing Co., Inc., 1050 Military Road, Buffalo, N. Y.



Something New in Belt Sanders

Made to place a real finishing machine within reach of those manufacturers whose work does not justify larger and more expensive belt sanders. There's no longer any economy in using crude, bungling, home-made near sander in the smaller woodworking factories. Figuring cost of making, together with the loss from unsatisfactory work, home-made finishing tools are far more expensive than the

Yates Number 430

This new belt sander is the result of most careful study. It embodies more good machine design than any other belt sander on the market. The I-beam-section end stands are something new—and more rigid for their weight than any other form. The table is very simple and strong, yet just as large as that on more expensive machines. Has just as much vertical adjustment. An adjustable idler keeps the sand belt in track. The new Yates 430 has every feature found on any other belt sander, and will absolutely "do the business" for which it was made. The price is attractive and early deliveries can be promised.

Photographs and printed information will be mailed at your request
No expense or obligation on your part involved

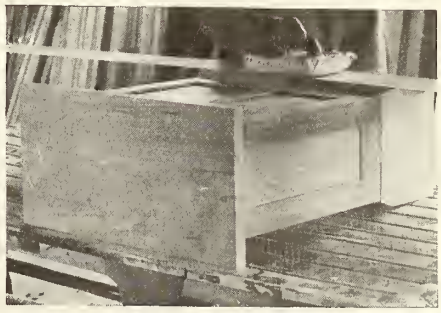
P. B. Yates Machine Co. Ltd.

HAMILTON, ONT. CANADA
U. S. Plant: BELOIT, WISCONSIN

The Yates Flexible Belt Sander Applied to the Finishing of Stair Rails.

Yates

"The Invariable Choice of the Man Who Knows"

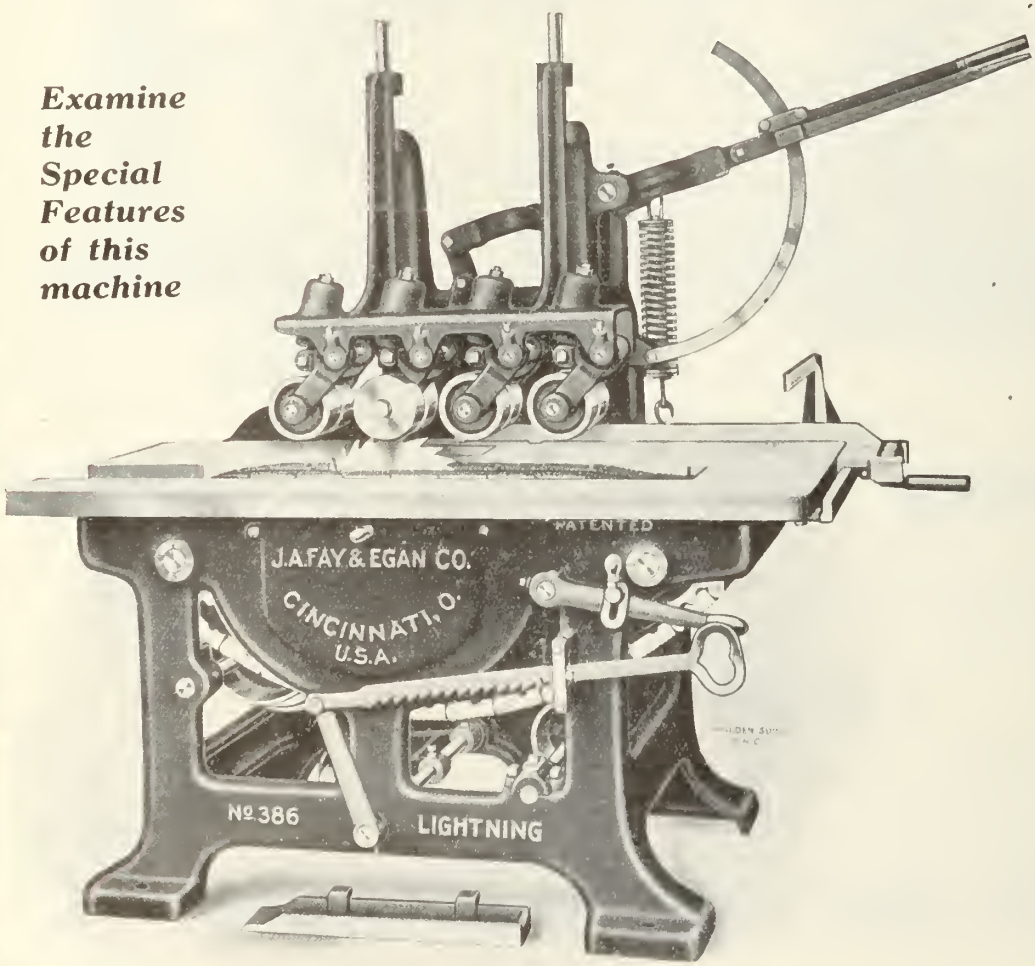


Sanding a Colonnade Base. Typical Application of Machine to Paneled Work.

New Straight Edge
Ripping and Jointing Machine

Makes perfect straight joint ready for glueing
Built in two sizes

Examine the Special Features of this machine



Prevents any twisting on either long or short stock.

Saw arbor easily accessible for oiling.

Double feed chain of flat milled links, each link removable and interchangeable.

Instantaneous adjustment of all rolls easily made and automatically locked at any point.

Spring counterbalance makes roll adjustment easy.

Saw blade easily accessible by removing plate.

Chain adjustable above table for rough, crooked, or finished stock.

No. 386 Straight Edge Ripping and Jointing Machine.

Saves 33⅓ to 50 per cent. in Wages, 10 per cent. in lumber and also uses up your waste stock

NOTE—**Saw cuts from below** and all sawdust and slivers are drawn down and away from the saw and do not scatter over the work and get into the operator's *eyes, ears, nose and mouth*, as in the case where saw cuts from above.

Circulars fully describing this new machine will be gladly mailed to all interested parties

Jackson, Cochrane & Company
KITCHENER, ONTARIO

The "Shimer Limited" Expansion Head

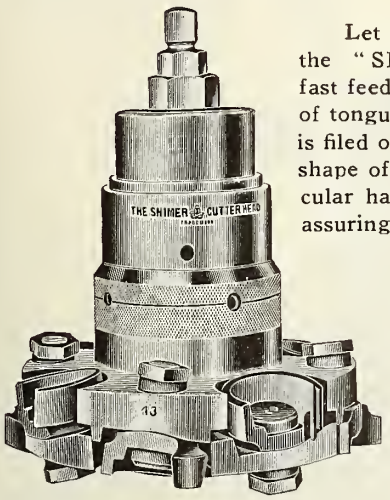


Fig. 627

Let us draw your attention to the advantages of using the "SHIMER CUTTER HEAD" for general Mill and fast feed Planer work. The Cutter is turned to cut the shape of tongue and groove desired, so that to sharpen the cutter it is filed or ground on its face, guaranteeing the user the same shape of cut during the life of the cutter. The bit being circular has from 3½ in. to 5 in. cutting length to the cutter, assuring long wearing life to the cutters.

Note that the cutter, being fastened to a concave seat on a compound angle, assures the user of the proper clearance of cutters, consequently they never burn.

These heads are fitted with or without the Self-Centering Sleeve, and made Expansion or Solid, to suit the customer's wishes.

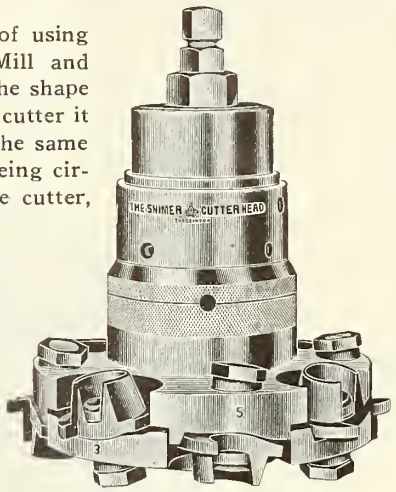


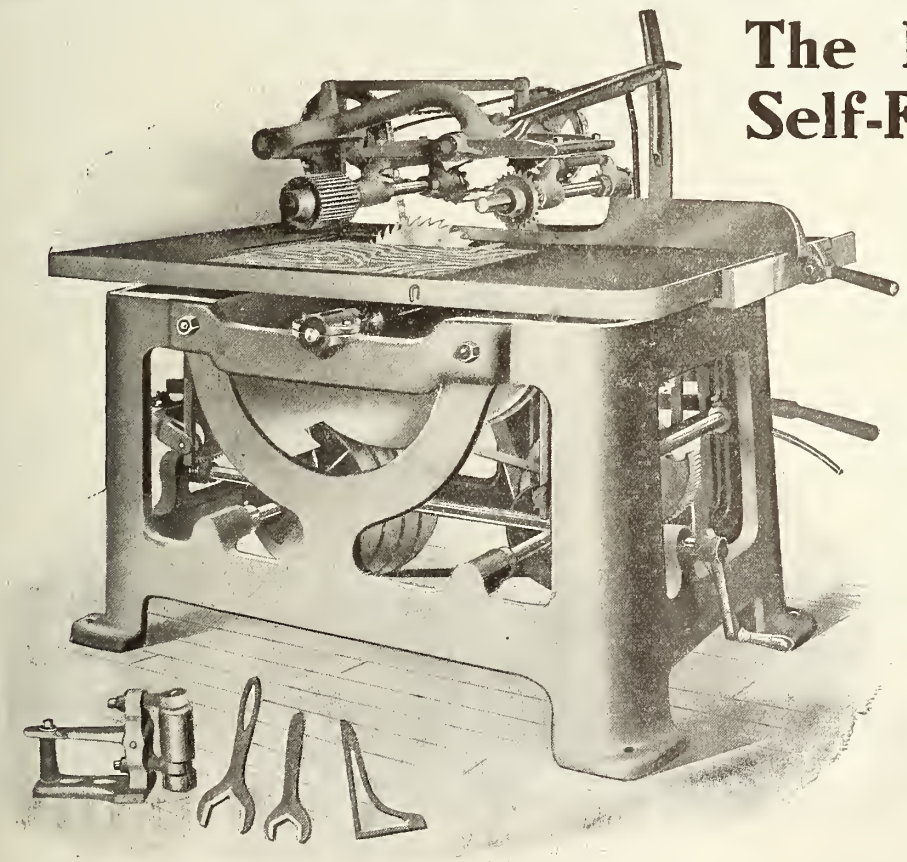
Fig. 268

Shimer Heads have been in use for sixty years, and their reliability and reputation have spoken for them in the past. Let us know your wants and we will guarantee their reliability at the present.

SHIMER CUTTER HEAD CO. OF CANADA, LIMITED

Successors to Samuel J. Shimer & Sons, Inc.

GALT, ONTARIO



The New Hoosier Self-Feed Rip Saw

This is our Standard or No. 1 Hoosier Self Feed Rip Saw, which is now built with hinged upper feed works so that they can be quickly and easily raised up out of the way and the machine used for hand-feed work.

The machine is capable of ripping as thick as 6 in. and as wide as 20 in., and can be used for single, gang, or bevel ripping, the feed being strong enough to pull six saws through 1 in. stock. Four rates of feed are provided from 35 to 150 ft. per minute.

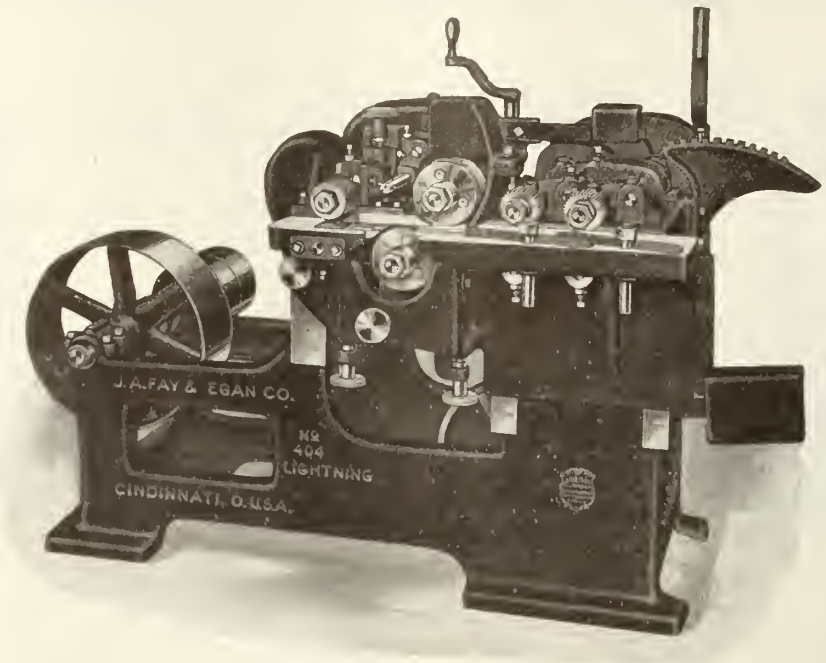
To take care of special ripping problems we build Hoosier Rip Saws in seven other styles.

For further information address

The—

Sinker-Davis Company

INDIANAPOLIS, IND.



A NEW MACHINE FOR MAKING PENCILS, SKEWERS, DOWELS, AND ESPECIALLY *FLAG STICKS.*

PENCILS — Stock of foreign made pencils, imported before the war, are exhausted—a new supply must be manufactured. This machine makes the wood part, round, hexaround or hexagon.

SKEWERS — Always in big demand—a good staple product—made on a No. 404.

DOWELS—More used now than ever—big demand for use in wood ship and small boat construction — No. 404 makes them.

FLAGSTICKS — Right now stocks are completely exhausted—big demand unsatisfied—market will continue strong—No. 404 the only real flag-sticker made.

This is a new big production machine — Get one now—It will pay you well—Ask for Bulletin E-15.

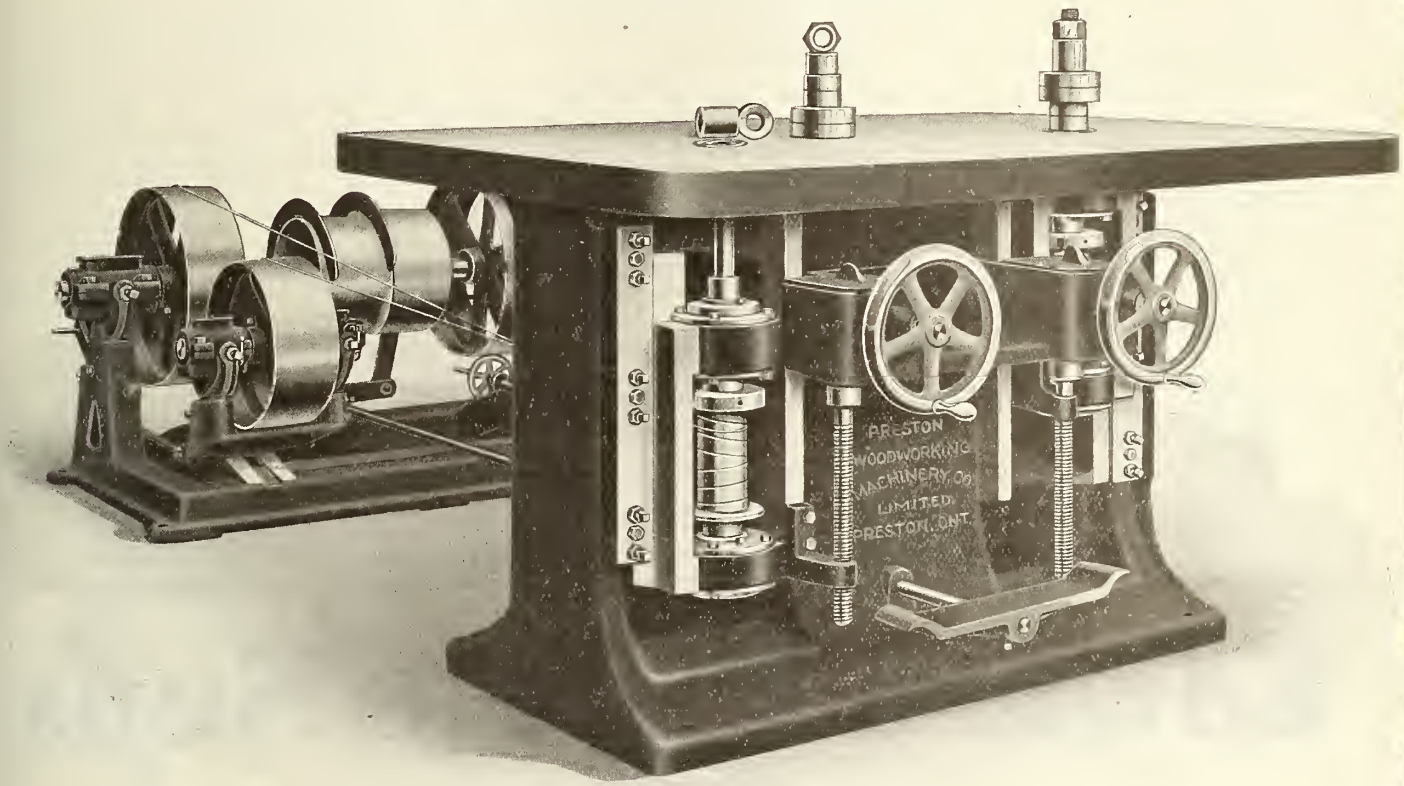
J. A. FAY & EGAN CO.

153-173 W. Front Street CINCINNATI, OHIO

"Treat your machine as a living friend."

Don't Waste Time

for which you are paying big money by having a Machine in your plant which is not giving you a maximum of production every day



No. 162 High-Speed Ball-Bearing Shaper

SEE THIS MACHINE!

It's built absolutely on honor, and will turn out 100% MORE WORK than the ordinary shaper which you are now using. That's our claim; twice the amount of work and much easier on the operator. Is it worth your while to cut your shaper cost in two? If so, drop us a line for more particulars.

THE CHEVROLET MOTOR CO. ARE USING 6 OF THESE MACHINES IN THEIR PLANT AT OSHAWA

DIMENSIONS, WEIGHTS and SPEEDS

Floor Space, 120 in. x 58 in. Net Weight, 2650 lbs. Shipping Weight, 2750 lbs. Tight and Loose Pulleys on Countershaft, 10 in. x 6 in. Driving Pulleys on Countershaft, 18 in. x 5 in. Idler Pulleys, 14 in. x 5 in. R.P.M. Countershaft, 1200. Pulley on Spindle, 3⅛ in. x 6 in. R.P.M. Spindle, 7000. Diameter Spindle, 2 3/16 in. Spindle Centres, 28 in. Table, 58 in. x 41 in. Diameter Spindle Top, 1¼ in. Horse Power Required, 3. Front Projection, 17 in. Height, 35 in.

"The Machine you want in your plant is not the cheapest machine to buy but the machine that will save you the most money to use."

The Preston Woodworking Machinery Co. Limited, Preston, Ont.

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Edward Clark & Sons

Toronto

CANADIAN HARDWOODS—winter cut **Birch, Basswood, Maple**

Ontario and Quebec Stocks, East or West, rail or water shipment direct from mill to factory.

Let us quote you on bored diaphragms for Bethlehem boxes, interlocking style, guaranteed to meet Imperial Munition Board requirements.

We Commend to Your Notice:

Our lumber is **reliable**, our grades **uniform**, our shipments **prompt**, and **receive personal supervision**; our prices **consistent**. We have had **long experience**. We desire **to serve**.

Insure Long Life to Your Product By Maintaining and Applying Glue at the Correct Temperature

To insure satisfaction to your customers, and prevent glued joints from coming apart "out on the job" it is necessary that animal glue be kept and applied at a temperature of 145 to 150 degrees Fhr.

"INTERNATIONAL" ELECTRIC GLUE HEATERS maintain the correct working temperature at all times and under all conditions. **CAN YOU** afford to do without "INTERNATIONAL INSURANCE" on your product? Obtainable at no extra cost.

You insure your plant and equipment. What about your product and the good-will of your customers?

The International 1-qt. heater operates on **less than one cent per day** for current. Soon saves its initial cost in glue saved, more economical operation and time conserved. Absolutely safe, clean and economical. No fire risk.

Fireless cooker principle of construction prevents radiation. No skin, scum or dirt on glue. No hot steam pipes during summer months. No leaky valves.

Constructed entirely of heavy spun copper. No seams. No water bath. No burnouts. No burnt glue. Three heats—high, medium and low. Provides rapid melting and uniform temperature control for all working conditions. Portable—fits any lamp socket.

Operates on less current than any other electric glue heater.

Write for illustrated folder, "Correct Temperatures in the Glue Room"—information of interest to every practical glue man. Get our quotations on "International" Electric Glue Heaters—sizes 1 pint to 50 gallons.

INTERNATIONAL ELECTRIC COMPANY
MANUFACTURERS
ELECTRICAL HEATING APPLIANCES
INDIANAPOLIS, U.S.A.

5 Gallon 4 Quart 2 Quart 1 Quart 1 Pint

Saint Francis Basin Band Sawed Oak

Soft Textured, Evenly Colored, Red and White

GET THE THRIFT OF LUMBER BUYING

Stock put in transit May and June will relieve you of July, August and September worries.

We are Headquarters for

St. Francis Basin Kraetzer Cured Gum

Send us a list of your requirements. — Delivered Prices will be cheerfully quoted.

GEO. C. BROWN & CO.

Mill—PROCTOR, Ark. **Main Office—MEMPHIS, Tenn.**

We specialize in Tennessee Aromatic Red Cedar

RED GUM

"AMERICA'S FINEST CABINET WOOD"

The really successful merchant, it matters not in what line, is he who takes the trouble to ascertain

WHAT THE PUBLIC WANTS

This is especially true in its application to the furniture manufacturer and his retailer. He *has to* study his public—or he soon will have no public.

That portion of his public which is influenced by the principles of good taste wants RED GUM furniture—Why? Because the color, grain and soft, velvety quality of this, the finest of America's cabinet woods, when handled by a master cabinet-maker, results in a thoroughly charming piece of furniture—the kind that people of nice discrimination like to have around—and want strongly enough to *ask for*. Then can YOU supply it?

Makers and dealers desiring to see samples of RED GUM, both rough and finished, are invited to correspond with us at once.

GUM LUMBER MANUFACTURERS' ASSOCIATION

1314 Bank of Commerce Bldg., Memphis, Tennessee.

Dry Spruce and Birch

Good Stocks, Prompt Shipments, Satisfaction

C. A. SPENCER, Limited

Wholesale Dealers in Rough and Dressed Lumber

Offices—500 McGill Building
MONTREAL - - Quebec

Churchill Milton Lumber Co.

Louisville, Ky.

We carry at
NEW ALBANY, IND.

Genuine Indiana Plain and Quartered Oak, Poplar

At GLENDORA, MISS.

Cypress, Gum, Cottonwood, Oak

SEND US YOUR INQUIRIES

We have dry stock on hand and can make quick shipment

American Hardwood Lumber Co.

St. Louis, Mo.

Large stock of—

Dry Ash, Quartered Oak Plain Oak and Gum

Shipments from — NASHVILLE, Tenn., NEW ORLEANS, La., and BENTON, Ark.

TWENTY YEARS OF SQUARE DEALING IN

HARDWOODS

Manufacturers

Mississippi Mills

Plain Oak	Red Gum
Quartered Oak	Sap Gum
Cypress	Cottonwood

Missouri Mills

Soft Maple	Soft Elm
Tupelo	Oak Dimension

West Virginia Mills

Plain Oak	Poplar
Chestnut	Oak Dimension

CINCINNATI, OHIO K-C U.S.A.

The **KORN-CONKLING CO.**

Head Offices—CINCINNATI, OHIO

BLACK WALNUT

Large Stock 1 to 3 inches thick ready for immediate shipment

also

Well Assorted Stocks of

West Virginia & Kentucky

OAK

Ash, Maple, Hickory, Chestnut, Basswood and Poplar

Prices and stock list on request

Burns & Knapp

Lumber Company

CONNEAUTVILLE, PA.

Dermott Offers You, Mr. Buyer:

QUARTERED WHITE OAK

3 cars 1 in. firsts and seconds.
1 car 1¼ in. firsts and seconds.
2 cars 1½ in. firsts and seconds.
1 car 2 in. firsts and seconds.
5 cars 1 in. No. 1 common.
2 cars 1¼ in. No. 1 common
1 car 1½ in. No. 1 common.
1 car 2 in. No. 1 common.

PLAIN WHITE OAK

10 cars 1 in. firsts and seconds.
4 cars 1¼ in. firsts and seconds.
2 cars 1½ in. firsts and seconds.
2 cars 1¾ in. firsts and seconds.
5 cars 2 in. firsts and seconds.
½ car 2½ in. firsts and seconds.
½ car 3 in. firsts and seconds.
5 cars 1 in. No. 1 common.
2 cars 1¼ in. No. 1 common.
1 car 1½ in. No. 1 common.
3 cars 2 in. No. 1 common.

PLAIN RED OAK

4 cars 1 in. firsts and seconds.
1 car 1¼ in. firsts and seconds.
1 car 1½ in. firsts and seconds.
5 cars 1 in. No. 1 common.
1 car 1¼ in. No. 1 common.
1 car 1½ in. No. 1 common.

PLAIN RED GUM

5 cars 1 in. firsts and seconds.
2 cars 1¼ in. firsts and seconds.
1 car 1½ in. firsts and seconds.
5 cars 1 in. No. 1 common.
2 cars 1¼ in. No. 1 common.
2 cars 1½ in. No. 1 common.

SAP GUM

7 cars 1 in. firsts and seconds.
2 cars 1¼ in. firsts and seconds.
2 cars 1½ in. firsts and seconds.
1 car 2 in. firsts and seconds.
5 cars 1 in. No. 1 common.
1 car 1¼ No. 1 common.
1 car 1½ in. No. 1 common.
1 car 2 in. No. 1 common.

Will be pleased to name you prices on any items in Southern Hardwoods. If you require well-manufactured stock, containing good widths and lengths, we can serve you.

DERMOTT LAND & LUMBER COMPANY

General Offices 1559 Railway Exchange Bldg. CHICAGO, ILL.

Band Mill and Yards—DERMOTT, Ark.

Long-Knight Lumber Co.

Manufacturers and Wholesale Dealers

INDIANAPOLIS, IND., U. S. A.

HARDWOOD LUMBER

Walnut, Mahogany

and

American Walnut Veneers

SPECIAL:

5 cars 5/4 1 & 2 Pl. Red Oak

The Atlantic Lumber Co.

Manufacturers

Strictly Soft Textured

Quartered and Plain White Oak Red Oak

Chestnut, Poplar, Cherry

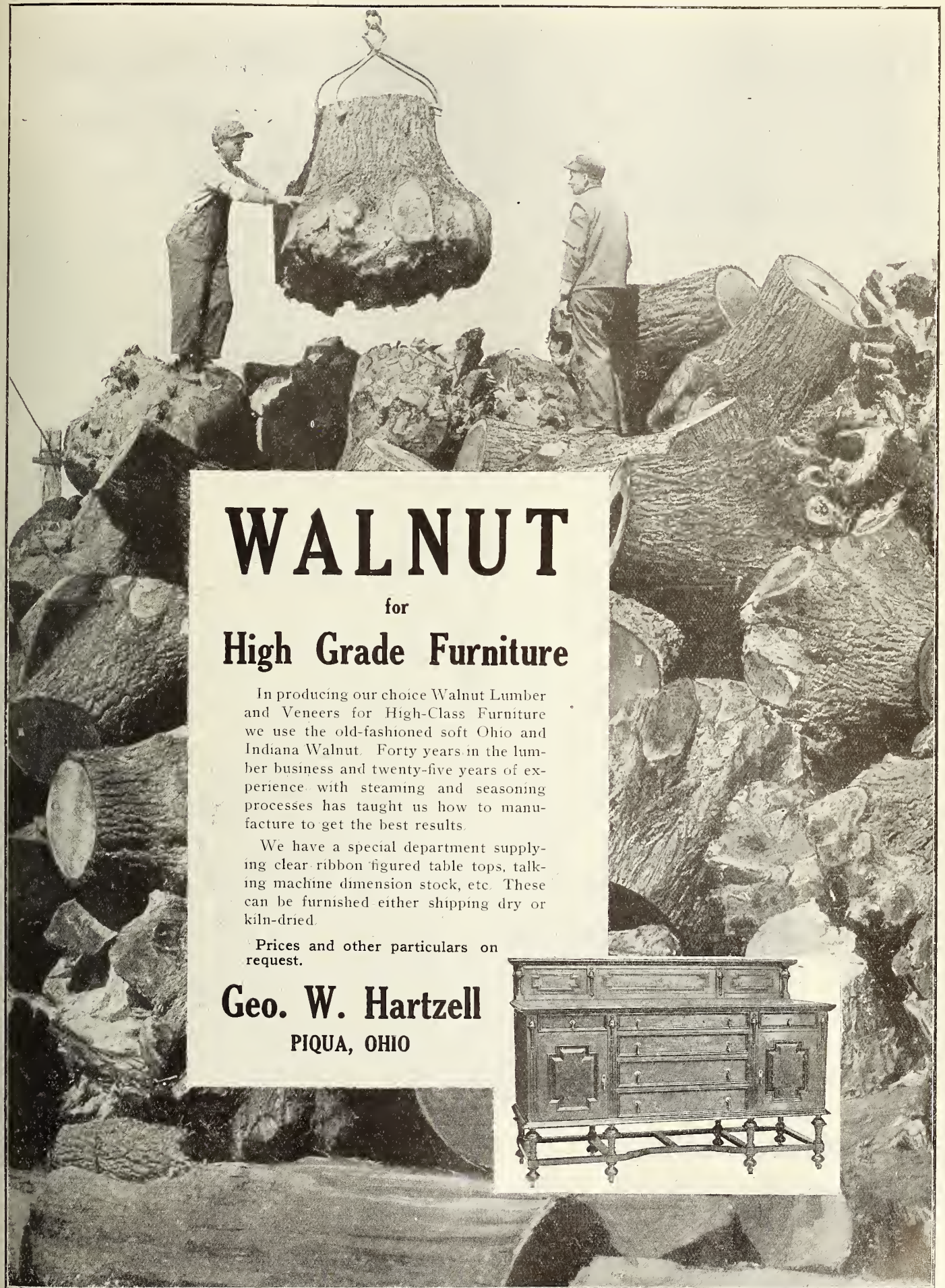
Tennessee Scented Red Cedar

High Grades—Quick Shipments

110 Manning Chambers Phone Main 6386 **- TORONTO**

HEAD OFFICE, BOSTON MASS.

Mills: KNOXVILLE, TENN., WALLAND, TENN. FRANKLIN, ARRINGDALE and BUTTERWORTH, VA.



WALNUT

for

High Grade Furniture

In producing our choice Walnut Lumber and Veneers for High-Class Furniture we use the old-fashioned soft Ohio and Indiana Walnut. Forty years in the lumber business and twenty-five years of experience with steaming and seasoning processes has taught us how to manufacture to get the best results.

We have a special department supplying clear ribbon figured table tops, talking machine dimension stock, etc. These can be furnished either shipping dry or kiln-dried.

Prices and other particulars on request.

Geo. W. Hartzell

PIQUA, OHIO

One of America's best Black Walnut trees. Grown in Central Illinois and purchased recently by

PICKREL WALNUT CO.

ST. LOUIS, Mo.

It clearly demonstrates the effort to obtain the best grade of Walnut for our customers. 19 foot butt log and about 40 inch diameter at top end with excellent figured stump.

Let us show you in the near future how it will look laid on the ground.

Two Conclusive Proofs Why You Should Buy Your Lumber From Us

Examine closely the picture above, then read the following letter we received a few days ago from one of the largest manufacturers of Mouldings in the world. (Lumber for Mouldings must be absolutely flat and straight.)

"We have been using exclusively gum lumber, both sap and red, shipped by you for the last three years, and have been well pleased with its character, both as to grade and condition. The condition of same being an evidence of careful handling before shipping. We have been well pleased with the transactions which we have had with you, and will endeavor to continue using your stock as long as available."

We also manufacture Oak, Ash, Elm, and Cypress at Louise, Miss., mills. Get our prices before placing your orders and become a SATISFIED user of Gum or one of the other Southern hardwoods.

BARR-HOLADAY LUMBER CO.

GREENFIELD - OHIO

We want your ORDERS for CABINET WOODS:

Walnut
Mexican Mahogany
Quartered White Oak (fine figure)
Plain White Oak (soft texture)
Ash, Cherry, etc.

Our prices are right—have a complete stock—can ship immediately.

Canadian Representative:
A. E. KLIPPERT
11 Laxton Ave., TORONTO
Phone Parkdale 1354

LELAND G. BANNING

CINCINNATI, OHIO

Wilfrid H. Pauzé

LUMBER MERCHANT—SASH and DOORS

The

Largest Eastern Warehouse

of British Columbia Products

I can supply at short notice mixed carloads of

FIR DOORS, COLUMNS, MOULDINGS, RED CEDAR CLAPBOARDS AND SHINGLES, FIR V-JOINT SHEETING, FLOORING

Beaver Board Distributor

1822 Cote des Neiges - Montreal

MAHOGANY of CHARACTER

M B

Martin-Barriss hardwoods offer something new in the way of service. This is particularly true of our thoroughly kiln-dried mahogany. If you require mahogany of character, possessing any particular figure, we are prepared to cut into log after log to obtain that figure.

Ask us about our service and prices

The Martin-Barriss Co.
Cleveland, Ohio

Crating Lumber

SPECIAL—1"x2" Crating Spruce. This is dressed one side to 7/8" and bundled, a very desirable lot.

Read Bros., Limited
43 Victoria Street
Toronto -:- Canada

"Gum of Quality"

Yazoo River Red Gum

as produced by

Thomas & Proetz Lumber Company
3400 No. Hall St. St. Louis, Mo.

is carefully manufactured; soft in texture; dark, rich in color; and admirably suited for furniture and interior trim.

Mills—Belzoni, Miss.; Catchings, Miss.; Naples, La.

If you are not buying from us, write today.

Galbraith & Co., Ltd.

Owen Sound, Ont.

Manufacturers of

"Well-Made" Wood Specialties

Toys, Games, Turned Goods and Kitchenware

We Specialize on
CUSTOMS TURNINGS

Your order will receive prompt attention

Defiance Wood Benders

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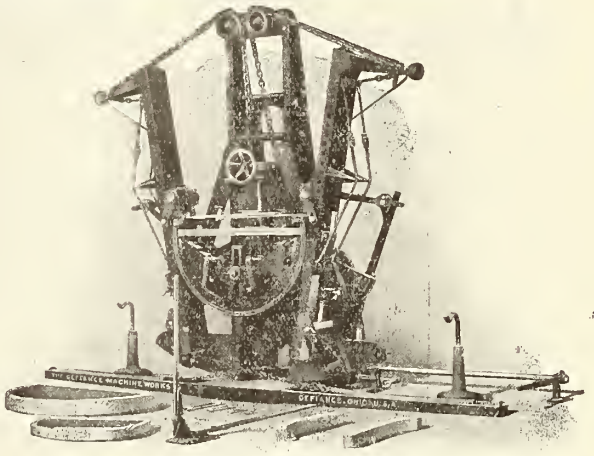

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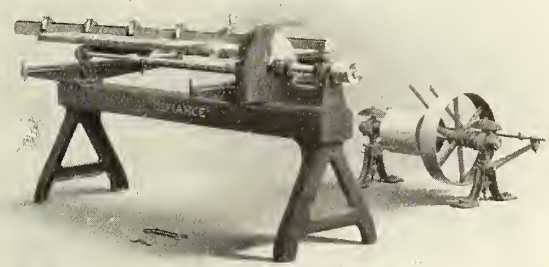

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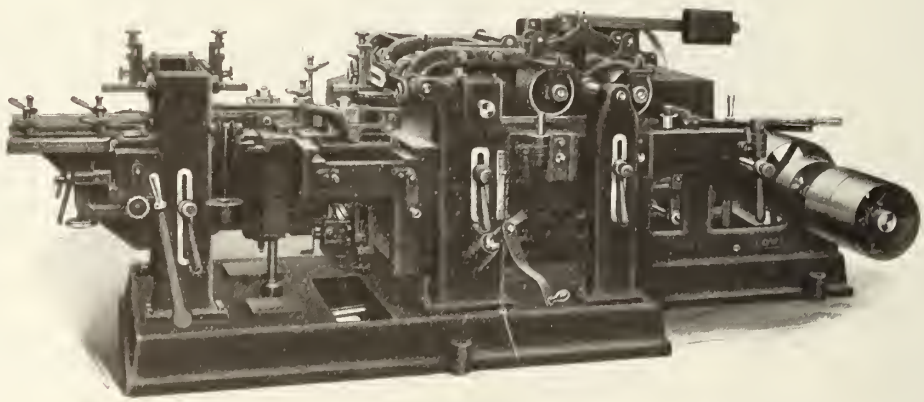

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British Columbia Woods

The uses of the woods of British Columbia are discussed at some length in this issue. The general opinion seems to be that British Columbia woods are excellently adapted for exterior and interior finish for buildings of all kinds, as well as for construction purposes, but that they are of very little use in furniture work except for cheap lines.

Douglas fir is admittedly the most important of these woods. It is obtainable in the largest quantities, being the principal coast wood. Then it is suited to a wider range of uses than any of the other woods. Among the uses claimed for it are: Building construction work, interior and exterior finish, the construction of silos and water tanks, box making and cooperage.

One or two men interviewed held that Douglas fir was suitable for furniture making, but we are inclined to agree with the idea that the hardwoods now in use are more suited for that purpose, and that Douglas fir would only be suitable for a very cheap grade of furniture. It is not in any way discrediting the wood to say this. There is a limit to everything, and apparently Douglas fir has a large enough field without extending into the furniture industry.

Another British Columbia wood in great demand at present is Sitka spruce. It is being used extensively in the construction of aeroplanes. It is being shipped to England in large quantities for this purpose, besides the amount being used in Canada.

British Columbia's other woods are Western red cedar, Western larch, Western hemlock, and Western white pine. All the woods are used extensively for interior finish, for lap siding, and for various other planing mill products. A number of them possess similar qualities, so it is difficult to specify any particular wood for a certain class of work. Red cedar, of course, is popular for clothes closets on account of it being distasteful to moths. But, apart from minor reasons such as this, the British Columbia woods are equally applicable to many uses.

Mr. L. B. Beale, the British Columbia Lumber Commissioner for Eastern Canada, on behalf of the British Columbia Forest Branch, recently offered to the Toronto Board of Education a car of British Columbia lumber, to be used by the students in the woodworking classes of the Toronto Technical School, which offer was speedily accepted. The value of such a gift from a publicity standpoint is difficult to estimate. The students, many of whom may in the near future be large contractors, will become so accustomed to working with British Columbia woods that when they leave school and are in the market for lumber their thoughts will naturally turn to the woods they used at school.

Prominent lumbermen state that last year's trade in Douglas fir in Eastern Canada was greater than in any previous year, and that the quantity being disposed of this year promises to be even greater.

July Issue a Box Number

The July issue of the "Canadian Woodworker" will be a "Box Number." There is probably no industry where speeding up production counts for so much as in the box industry. The box maker's profits depend directly on the quantity of his output. The longer it takes a job to go through the factory the more overhead expense it is eating up. It, therefore, becomes necessary to study the work closely and cut out all lost motion.

Labor-saving machinery is an important factor in the box business. But there are so many efficient machines on the market that it is often difficult for the manufacturer to make a choice. Although individual conditions must always govern, it is an advantage to know what machines have proved most effective in other plants. In the "Box Number" the various types of machines in use for box factory work will be discussed by practical men. The efficient arrangement of machines will also be dealt with and various other subjects of direct interest to box manufacturers.

British Columbia Woods

Their Uses in the Woodworking Industries—Which Wood to Use—Douglas Fir Edge Grain Flooring—Piling and Kiln-Drying

Douglas fir tree.

Douglas Fir

By W. A.

Scientifically the wood is known as Pseudotsuga mucronata, P. taxifolio, or P. Douglasii. Besides being called "Douglas fir," it is known in trade as "red fir," "yellow fir," "British Columbia fir," or pine," "Douglas spruce," and "Oregon pine." "British Columbia pine" or "Oregon pine" are the most common export names. Formerly it was called "spruce" or "pine," because to call it "fir" would class it with the true firs (the genus Abies), which are totally different in properties, but now that it is better known there is no reason why it should not be marketed under its own name. Although botanically there is only one species, the mountain form, which grows where rainfall is light, is a tree much inferior in size and in general qualities to the coast form growing in the more moist climate. Only the coast form is exported.

Douglas fir is at present one of the most important of Canadian woods, and within a few years it will probably be the most widely used and valued of Canadian timbers. It is the largest structural timber growing in Canada or the United States. In Canada it is found in British Columbia and, to a limited extent, in Alberta. Trees have been measured up to 380 feet high, with a maximum diameter of 15 feet; the largest trees scale as high as 60,000 feet, board measure. This great size places the timber in the highest class for large timbers free from defects.

The wood is one of the hardest, heaviest, stiffest, and strongest to be found in Canada. The sapwood is usually narrow, being not over two inches wide. The heartwood varies in color from a decided reddish tinge to a light yellow. Timber from the eastern limit of its range, from second growth, or from the centre of old trees, is likely to be coarse-grained and red, but most of the coast variety produce the fine-grained, clear wood of a yellow color that has made Douglas fir famous. Absolutely dry, it varies in weight from about 24 to 34 pounds per cubic foot, with an average of approximately 288 pounds. The dark summer-wood is well developed, is hard, flinty, and clearly marked, while the spring-wood is soft and much lighter in both color and weight. The number of rings per inch is rarely less than eight and is commonly from twelve to sixteen. In general, wood having less than eight or more than sixteen rings per inch is weaker than that ranging from eight to sixteen. It is usually of uniform growth and comparatively free from knots and pitch. The average moisture content in green-sawn timber is up to 40 per cent., and is fairly evenly distributed throughout. In air-seasoned timber the average moisture may be reduced to less than 20 per cent., with less near the surface but more in the middle of the stick. Rapid drying of the surface produces checking, but drying, properly handled, produces a fine, sound, clear wood.

So far as structural timber in the Dominion is concerned, Douglas fir is by all means the most important, although there are several other species which produce very good structural timber. According to recent estimates of the Commission of Conservation, the total supply of merchantable Douglas fir timber is about seventy-five billion feet, board measure, and, since the tree grows satisfactorily under reforestation, there is little reason to believe the supply will be exhausted many years. In fact, proper protection should insure a perpetual supply.

Douglas fir is manufactured into almost all forms known to the sawmill operator. In building trades it is most important, being used for beams, columns, and heavy flooring in mill construction, as well as for all

Showing grain of Douglas fir.

kinds of dimension stock, joists, floor beams, rafters, flooring, siding, and finish of all kinds in general construction. For bridge, trestle, and harbor work Douglas fir is superior in many ways to any other Canadian timber. It is largely used by the railways in the form of ties, piling, car, and bridge material. It has long been the most important timber for boats and ships on the Pacific Coast, being suitable for both outside and inside work, especially for decking, planking, keels, yards, ribs, and finish. Increasing amounts of Douglas fir are being used for tight and slack cooperage, tanks

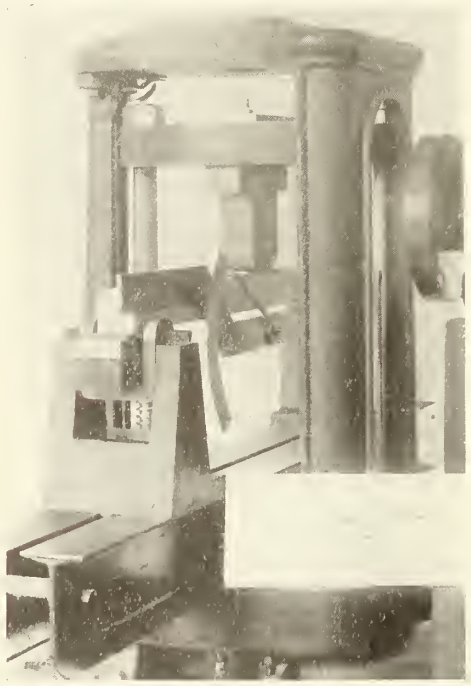
of all kinds, conduits and water pipes, paving blocks, boxes, and pulpwood.

Although the properties of Douglas fir enable it to be employed in such a variety of ways, it is probably most widely known as a structural material. For this purpose it is inferior to no other wood, and its straight, clear trunks can supply timbers of the largest size and highest quality.

The Forest Products Laboratories of Canada, Montreal, have recently completed a series of tests on Canadian Douglas fir, some results of which are summarized in the accompanying table. These tests were made on shipments of timber from three localities, representative of different climatic conditions occurring throughout the range of this species in Canada. Thus one shipment was taken from the well-watered coast region of British Columbia, where Douglas fir attains its best development; another came from high up on the western slope of the Rocky Mountains, in British Columbia; and the third from the east, or Alberta slope of the mountains, at about the same altitude. In each locality five trees of average development were selected, and one four-foot test log taken from each. The test-pieces cut from these logs were all of a standard cross section of 2 by 2 inches. All were of clear material, free from all defects. The tests were made while the wood was still in the green condition.

Tests on clear specimens are valuable as a basis for comparisons of the properties of different species and of shipments of the same species from different localities. Defects, such as knots, checks, shakes, etc., affect the strength of wood in which they occur to a very considerable extent ,and of two species, one inherently much stronger than the other, it would be quite possible to find specimens of the stronger, which, owing to the presence in them of defects, would test weaker than moderately clear specimens of the weaker species. Tests of material containing defects are, therefore, likely to be misleading. Tests of specimens free from all defects, on the other hand, avoid this difficulty, and figures truly representative o fthe relative strengths of different species are secured.

Moisture is another factor which affects the strength of timber to a very marked degree. Freshly-cut, green timber contains moisture, which saturates the substance of the minute cells of which the wood is composed; and, in addition, free water is held in it mechanically as a sponge. In drying, after all the free water (which naturally evaporates first) has been removed, any further reduction in the moisture content of the wood substance itself results in rapid increase in strength and stiffness. Until the free water has all been removed, however, variations in moisture content have no effect upon strength. For this reason wide variations of the moisture content of green wood have no effect upon strength, whereas slight variations in the moisture content of wood dried below the "fibre saturation point" affect the strength greatly. Hence the importance, in making a series of tests the object of which is to determine the relative strengths of different species of timber, of testing all in the green condition,



Method of testing small clear specimens. Static bending.

so avoiding any effect upon strength of variations in moisture content.

In the series of tests at present under discussion all comparisons of species are based on tests of green material, supplementary tests being made to determine the effect of air drying.

Similar tests have been made in the United States on timber grown in that country, which are directly comparable with the results now being obtained for Canadian woods. No very great differences in the properties of Douglas fir as grown in the two countries have been discovered.

The laboratories have in view the testing of large

Species	Locality where grown	Seasoning	Rings per inch	Static Bending						Compression parallel to grain			Compression perpendicular to grain	Hardness			Shearing parallel to grain	
				Fibre stress at elastic limit per sq. inch	Modulus of rupture per sq. inch	Modulus of elasticity per sq. inch	Work in bending per cubic inch of specimen			Compressive stress at elastic limit per sq. inch	Crushing strength, maximum load per sq. inch	Modulus of elasticity per sq. inch	Compressive stress at elastic limit per sq. inch	Load required to imbed a 0.444-inch sphere of steel to one half its dia.			Shearing strength per square inch. The plane of failure being	
							To elastic	To maximum load	Total					Radial surface	tangential surface	end surface	Radial	tangential
Douglas Fir (mountain)	Morley, Alta.	Green	26.2	3880	6770	1232	0.69	7.6	12.6	2800	2960	1908	457	436	419	505	817	856
Douglas Fir (mountain)	Golden, B.C.	"	17.4	4390	7530	1488	0.74	6.9	14.9	2510	3380	1683	495	454	474	543	886	915
Douglas Fir (Coast)	Abbotsford B.C.	"	13.3	5210	8180	1736	0.88	6.5	18.4	3430	4010	1932	535	463	450	568	881	930

Table showing results of strength tests made on Douglas fir at the Forest Products Laboratories of Canada.

timbers of Douglas fir in sizes commonly used in actual construction, in order to investigate the effect of defects upon strength, and to obtain data as to the strength of the various commercial grades of this species.*

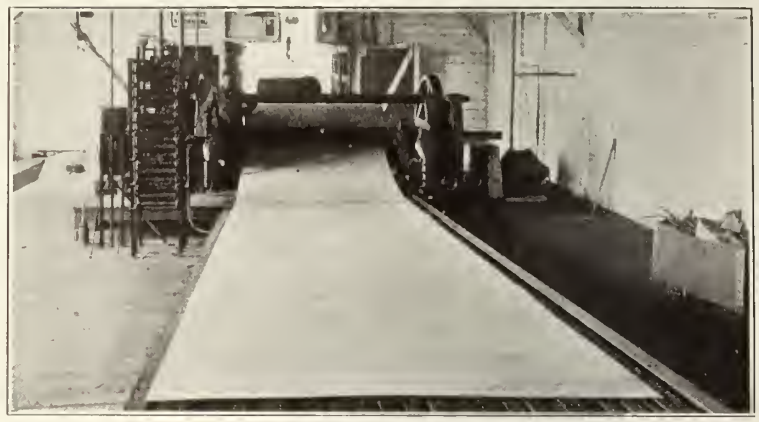
In Western Canada, Douglas fir is the general purpose wood. It is used for interior finish in all medium-priced and better class houses, office buildings, etc., and for outside sheathing, veranda construction, and cornices. Cedar and Douglas fir are the only woods carried in stock by the average planing mill, especially on the prairies. Practically all planing mill products are made from these woods. Cedar is used extensively for sash and for exterior siding, it being entirely satisfactory for this work.

Douglas fir will hold nails well, and, when put in place, can be finished in almost any desired color or finish. It is particularly adaptable for panelled walls, owing to its attractive appearance and the immense size of panels that can be obtained.

Probably the best panels are those made of three-ply stock. The veneers for outside plies are peeled from the log while it revolves in a machine, as shown in the accompanying illustration. The core stock is usually thicker than the outside veneers, depending on the thickness of panel desired. Panels more than three-eighths of an inch thick should be made five-ply. Five-ply panels are not so liable to warp as three-ply, and can, therefore, be used in larger sizes.

Another of the prominent uses of Douglas fir is boat and shipbuilding. In the near future 100 ships, each requiring 1,500,000 feet of lumber, will be built in Canada for the Imperial Government. Douglas fir will be used almost entirely for these vessels. Water does not soften the wood, and it finds a place in small rowboats as well as in the larger vessels.

In 1913 there was more Douglas fir timber cut in Canada than any other single species. Only the spruces, collectively, produced more timber than did Douglas fir, while in 1914 the spruces and white pine both produced more. Although the cut in 1915 decreased, it may be expected to increase rapidly hereafter in yearly production, as it is the only timber in North America of which great areas, accessible to easy development, remain untouched. British Columbia cut practically 601,643,000 feet, B.M., of Douglas fir, worth $6,810,000, at an average value of $11.32 per thousand feet, which were cut in 1914. In 1915 the production was 453,534,000 feet, B.M., with an average value of $11.76 per thousand feet.



Cutting Douglas fir veneer.

Kiln-Drying British Columbia Woods

By B. James

One of the most important phases of lumber manufacture is kiln-drying. A great many improvements have been made of late years in the construction of kilns and in the methods of piling, heating, and ventilating. There is a great deal more difficulty in kiln-drying some woods satisfactorily than others. The general principles, however, are the same, and these are enumerated below.

Extremely high temperatures cause the wood to become too brittle. The heat should, therefore, be very carefully regulated. In piling, care should be taken to see that the piles are arranged so as to enable the heat to enter the wood uniformly. The use of wide stickers should be avoided. All sticks used should be of an equal thickness, and the strips should be piled directly above each other, so that an even pressure will be applied on the pile. Vertical piling has done a great deal towards the elimination of checking and warping.

Draughts of outside air and too much ventilation cause the lumber to check and warp. If the lumber is subjected to the steaming process before drying, checking, warping and case-hardening will be prevented. British Columbia woods present no serious problems in kiln-drying, and, with the perfected methods now in use, a thoroughly satisfactory product is obtained. The majority of the British Columbia mills have given considerable study to the subject of kiln-drying, and have installed expensive equipment.

All lumber for interior finish should be properly kiln-dried before it goes into the building. Correct methods of kiln-drying prevent the resin from oozing through the varnish and also largely eliminate shrinking and swelling. If these points are attended to there should be no difficulty in securing a high-class finish.

A great deal of dimension lumber is now dried for uses where dry material is desirable. Some architects are very cranky about the lumber for all work on the buildings being thoroughly dry, so that when the specifications call for kiln-dried material the builder will find that he can generally secure this stock from the mills. No serious difficulties are experienced in drying dimension stock up to 3 in. in thickness. All the British Columbia woods require about the same treatment, with the possible exception of Douglas fir, which is somewhat harder and has to be steamed very thoroughly when it first enters the kiln.

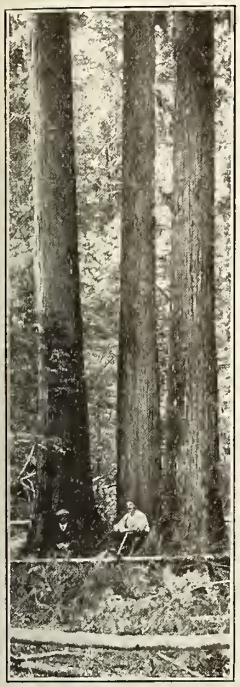
Some experimenting has been done on the kiln-drying of spruce for box-making. The general principles for drying box lumber as laid down by some experienced British Columbia box men are: That the lumber must enter into a very moist atmosphere, at a moderate temperature, and must be kept there until the board is heated through. When the moisture from inside of the board is started out the moisture can be gradually reduced, but it must never be entirely eliminated. Spruce requires more moisture at the finishing of the drying process than any other wood.

A word to the wise may be regarded as sufficient, but to the unwise many words are as nothing.

* The information on timbers and timber tests was prepared at the Forest Products Laboratories of Canada.

Planing Mill Products

By A. Ritchie



Western red cedar.

British Columbia has about everything in the way of forest products required by the house-builder, for both interior and exterior finish. Starting with exterior finish, British Columbia red cedar is probably best adapted for this purpose. It can be obtained in any pattern required, but the most popular design is bevel siding. In using, each piece is lapped over the next—in fact, it is known by a large number of users as lap-siding. British Columbia cedar is soft enough to work up easily, yet strong enough to resist the elements, takes and holds paint well, and practically never rots. For cornice and outside trim British Columbia fir, spruce, and hemlock are used. Spruce is the most popular, but of late has been rather hard to obtain on account of large amounts being required by the government for aeroplanes and shell boxes. British Columbia hemlock is now being used by a large number of builders, with satisfactory results. It is stronger than cedar yet not too hard to take paint well.

Western hemlock, because of its strength, lightness and ease of working, is excellent for dimension stuff and boards, though it is less durable than Douglas fir when exposed to the weather. Western red cedar is not so generally used for common dimension material and boards, because Douglas fir and Western hemlock are harder, stronger, and cheaper. Cedar is, however, very useful in construction work wherever durability or light weight is the main consideration, as for example, where wood is to be used in contact with the soil.

Shingles

Western red cedar shingles are unexcelled as a roofing material. Nothing else compares with them for durability, cheapness, and appearance. Many instances are found in which the red cedar shakes (shingles split by hand) with which the early buildings in British Columbia were covered, are in an excellent state of preservation, after having been in service since the early forties and fifties. In other instances shingles

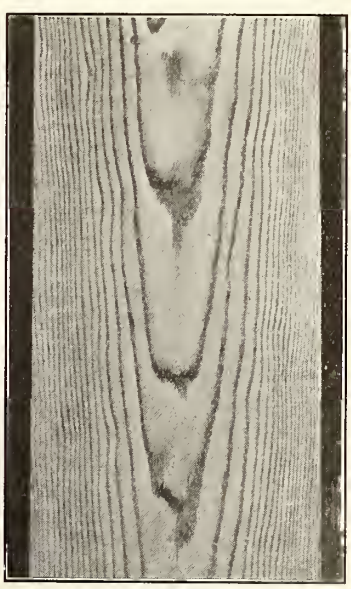
Showing grain of Western red cedar.

have remained in use after 30 to 35 years' service. Sawn cedar shingles, without paint or treatment, last from 20 to 30 years, according to the situation in which they are used. The general reason for repairs is the rusting out of wire nails used in roofing. The use of zinc, copper, galvanized or cut iron nails overcomes this difficulty and greatly lengthens the life of the roof.

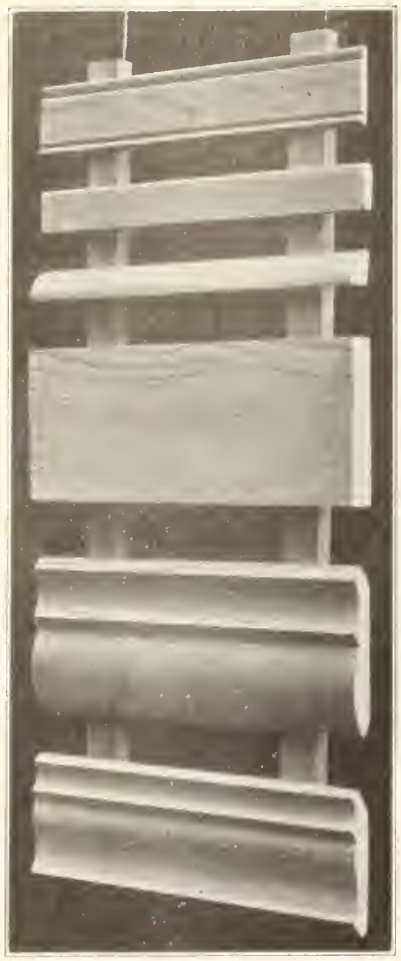
Shingles sawn edge (or vertical) grain will lie flat,

Western larch.

Western soft pine.



Sitka spruce.



Western white pine interior finish.

and will not warp or twist, even after years of exposure to the elements. British Columbia edge-grain shingles are of the highest quality, and practically the entire output of the province is edge-grain material. Dry, light wood is almost a non-conductor of heat or cold. Western red cedar is one of the best natural conductors known or commercially available, because it is unusually light, is by nature a dry wood, containing no pitch, and is impervious to rain or wind.

Very attractive architectural effects can be secured by the use of red cedar shingles. This is particularly to be noticed on the Pacific Coast, where the shingle is not only the predominant roofing material, but is also used with good effect as an outside wall covering. Shingles of different sizes and forms than the standard are cut to order by the mills. The various kinds of dimension and fancy butt shingles artistically colored are used in obtaining a stylish and finished appearance to many types of buildings.

The remarkable durability of red cedar makes preservative treatment unnecessary, but, if desired, they can be easily stained or painted in any shade or color, and beautiful color schemes may be obtained in this way. Stains or paints can be applied with a brush to dry shingles after laying, by which means a superficial covering of the exposed part of the shingle may be obtained. Shingles can be more thoroughly treated by immersing in creosote at about the temperature of boiling water. Dry shingles should remain in this for about 30 minutes, but in the case of green material the time should be extended to an hour or more. Any of the common colors ground in oil can be mixed with the creosote.

Interior Finish

For interior finish British Columbia Douglas fir is the most popular, because of its pleasing grain. It is attractive in natural finish, but the best results are obtained with a golden or mission stain. The mills in British Columbia manufacture everything required to finish the modern home, such as flooring, ceiling, casing, baseboards, mouldings, doors, panels, columns, stair-treads, etc. Eastern Canada is using larger quantities of British Columbia products each year. They are fast becoming the most popular soft interior finish woods, and to a great extent have replaced yellow or Georgia pine. In 1916 Eastern Canada used over double the amount of Douglas fir used in 1915, and, judging from the demand to date, the amount used this year will break all records. Planing mills and factories not accustomed to working Douglas fir should bear in mind that the best results are obtained when machine knives are very sharp.

Window Sashes and Doors

Douglas fir is used to a greater extent than any other wood by the sash and door manufacturers of British Columbia. In fact, most doors used on the Pacific Coast are made from Douglas fir. The wood is easily worked, presents a hard surface, and is strong and durable. Even the clear and No. 1 grades, which are used in this work, are inexpensive, and there need be little or no waste in cutting out material. Edge-grain stock, which is easily obtainable, is generally used for frames.

Flooring

All Douglas fir flooring is sawn edge-grain, and the hardness, wear, resisting qualities, and ease of working of the wood, combined with its beauty of grain and ability to take a high polish, have led to its extensive use. It is very popular as a house flooring on account of its beauty and cleanliness; it is especially attractive in the form of a parquetry floor. It is equally popular and in general use for factories, warehouses, and other places where it is subject to hard usage, because of its strength, resistance, and cleanliness.

Western larch interior finish.

Western hemlock, when cut edge-grain, also makes an excellent flooring material. It finishes smoothly on account of the uniform texture of the wood, and it also wears evenly. It is not suitable for use in damp places, on account of its tendency to warp under such conditions.

Wood Panelling

For beauty, comfort, cleanliness, and cheapness combined, wood panelling is an ideal interior finish. It is used extensively throughout the Pacific Northwest, and is finding great favor wherever introduced elsewhere. The old-fashioned painted door is being replaced by doors with panels of slash-grained Douglas fir or hemlock, finished in the natural wood so as to bring out the full effect of the beautiful figuring. Plaster and paper-covered walls, partitions, and ceilings are likewise giving

way to wood panelling. The all-wood room gives the utmost in beauty and comfort.

Another desirable interior finish wood is Western red cedar. It holds its shape well and retains its smooth surface. In its natural color the wood somewhat resembles mahogany, although, of course, it is much softer and lighter. It has a distinctive, silky finish, and takes stain well. Slash-cut Sitka spruce has an attractive grain or figuring, and the soft, easily-worked wood is well adapted to panelling.

For all the minor kinds of interior finish such as wainscotting, shelving, moulding, casing, baseboards, etc., Douglas fir is in most general use because of its attractive grain, abundance, and cheapness. Western hemlock, Sitka spruce, Western red cedar, Western larch, and Western white pine are also used for this class of work, in accordance with their respective qualities.

Use Drop Curtain When Drying Fir

Editor Canadian Woodworker:—We have confidence in saying that west of Winnipeg 90 per cent. of the houses and business blocks are finished in British Columbia fir. This is undoubtedly chiefly due to the fact that the cost is very considerably less than hardwood.

We have not seen British Columbia fir used very much for furniture, because there is practically no furniture made in the West, but we see no reason why it would not make up reasonably well for kitchen furniture or something of a cheaper nature than the best class of work. As you know, British Columbia fir has a beautiful grain, and makes a very nice finish indeed when properly cleaned up.

The matter of kiln-drying fir is something that has taken the attention of both the mills and factory for some time past. If the lumber is carelessly handled the waste in kiln-drying is very great, but if properly

Lumber piles in mill yard.

handled we do not think that the checked lumber or split ends would exceed 5 per cent. We believe that the most successful mills at the Coast put their fir in the kiln green from the saw and steam it for a good many hours to heat thoroughly the centre of the lumber and keep the outside from drying out first. We used to have a lot of trouble in keeping British Columbia fir from checking in our dry kiln, but we have overcome the difficulty to a large extent by installing a drop curtain, shutting off one-third of the kiln from the loading end. When a car of fir is put into the kiln we drop the curtain down and steam the lumber for several hours. When it is thoroughly heated we shut off the steam and allow the air to become dry through the natural ventilation provided. We have found this method of handling fir very satisfactory. Trusting that the above will be of some interest to your readers.—W. H. Clark & Co., Ltd., Edmonton, Alta.

British Columbia Wood for Furniture and Fittings

By J. Thompson

With the exception of verandah and garden furniture, British Columbia woods are of very little use for furniture making. True, in the Western United States Douglas fir and some similar species are used for a line of cheap bedroom suites, kitchen furniture, and even dining-room suites; but in the East such furniture is unknown. The various well-known hardwoods have become so thoroughly entrenched as furniture woods in the eastern sections of the country that anyone wishing to introduce a substitute would have to advance some very strong arguments in favor of the substitute. In the case of the British Columbia woods this cannot be done. In the first place, if used at all, it would have to be for the very cheapest lines, such as that now made up in imitation oak, etc., but even for these it is doubtful if the British Columbia woods offer any advantages.

Maple is the wood most widely used for making imitation oak. It can be kiln-dried and worked to good advantage. It has a hard, smooth surface, is practically colorless, and takes the finish well. Douglas fir is the most popular of the British Columbia woods and the one most likely to be used for furniture. If used to replace imitation oak it would not require to be grained, particularly if the slash-grained stock was used, as this has quite a large figure. But, on the other hand, the wood could not be machined as smooth and clean as maple or any other hardwood. Douglas fir is coarse-grained and slivery, the latter feature making it very unsuitable for chairs or seats of any kind.

For kitchen cabinets and pantry cupboards, etc., it can be used with good results. It finds another use for store fixtures, counters, wall cases, and in many instances it has been used successfully for church woodwork and fixtures. It can be used in the fitting up of libraries, in the manufacture of mantels, for panelled walls and ceilings, and for various other classes of fittings for residences, office buildings, and apartment houses. It is a noticeable fact, however, that even in Western Canada, where Douglas fir and other British Columbia woods are used most extensively, hardwoods are brought from Eastern Canada for really high-grade work.

Recently the prices of Douglas fir and other British Columbia woods have been climbing until they have reached a point where they are little less expensive than hardwoods. Then the railway car shortage has made it next to impossible to ship lumber from the Pacific Coast to fill orders in the East. In view of these unsatisfactory conditions, and the lack of real advantages, it is unlikely that British Columbia woods will ever be used in furniture factories.

This is not intended to detract from British Columbia woods in any way. They are excellently adapted for a wide variety of work. As general purpose woods they are hard to beat, but for the manufacture of furniture I think the well-known close-grained hardwoods now in popular use will continue in favor.

Box Material and Cooperage Stock

By J. Kane

All of British Columbia's woods are suitable for box-making, though some meet certain specifications better than others. Sitka spruce is white in color, odorless, and has no taste. It is of tough fibre, and is free from resin or pitch. Even when worked to very thin boards for box sides and tops, nails do not easily split the wood. Further, it holds nails with remarkable tenacity. Its light weight gives it a low transportation cost.

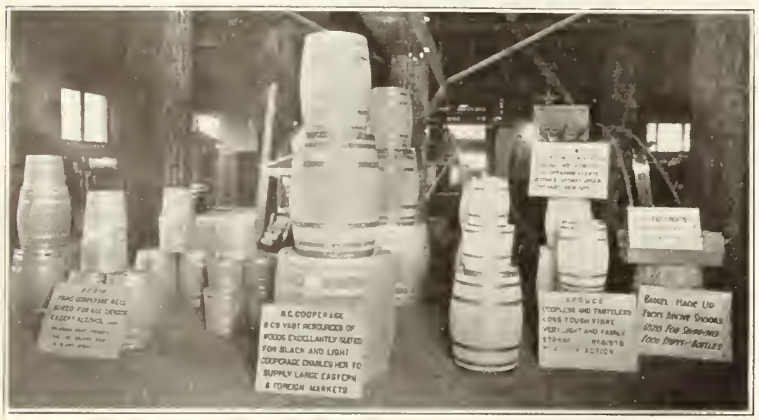


Exhibit of cooperage stock made from Douglas fir.

The largest balsam or true fir of the Pacific Coast is the white fir. It is light and soft, and for ordinary work is as good a box material as spruce. It works easily and takes and holds nails well. Cotton wood weighs only 23 pounds per cubic foot, kiln dried, and is one of the lightest and strongest box materials to be had. The wood is tough, soft, and easily worked, but will not withstand prolonged dampness or moisture.

The aroma of Western red cedar is said to be very distasteful to moths, and large quantities are used in making chests, boxes, and closet linings for storing clothes and furs. Another suitable box material is Western hemlock. The wood weighs 32 pounds per cubic foot, kiln dried. It is strong, and has no taste or odor when dry, but if subjected to moisture may become sour. It makes an excellent container for dry foodstuffs, fruits, canned goods, and most other dry commodities.

Cooperage

Douglas fir, sawn edge-grain, is the principal wood used in the Pacific Coast provinces for both slack and tight cooperage. It is very strong, durable, comparatively light, and does not tend to warp or soften with the action of weather and moisture. With some kinds of foodstuffs it is necessary to coat the inside of the container with paraffin or other substance to prevent the wood from imparting its taste to the food.

Sitka spruce barrels are used for sugar and other foodstuffs, the fact that spruce has absolutely no taste being to its advantage. The qualities which recommend it as a cooperage material are its freedom from resin or pitch, taste, or odor, and its straight grain, toughness, whiteness, and light weight.

Western hemlock is light, strong, odorless, and tasteless, and easily worked, and therefore also used to a considerable extent for the manufacture of barrels and boxes for shipping various materials, including foodstuffs.

Cottonwood is used by cooperage manufacturers in British Columbia, but, compared with Douglas fir or Sitka spruce, the quantity used is small. The wood when dry makes a strong, light, tasteless, and odorless barrel, but where resistance to moisture or weather is a considerable factor, fir and spruce are superior. The two illustrations presented herewith show a collection of box and cooperage stock made from British Columbia woods.

British Columbia Fir Flooring

The growing scarcity and consequent increased cost of suitable hardwoods for flooring is drawing particular attention to British Columbia fir as the only Canadian wood available in large quantities which is suitable for this purpose. And "the best general purpose timber in existence" is not wanting in the ability to produce an excellent quality flooring at a reasonable price.

While not possessing the hardness and wearing qualities of birch, maple, or oak flooring, the British Columbia edge-grain product does not compare at all unfavorably with these hardwoods, for, with its closely-set fibres of summer wood, it presents a surface which, in its resistance to wear, is very little inferior.

The ideal flooring material is that which combines cleanliness and attractive finish with durability. The characteristics of British Columbia fir suit it admirably to these requirements. When the strips are sawn edge-grain the strong, tough fibres of the summer wood are presented in closely-set straight lines, offering a smooth surface, capable of taking a high polish and withstanding the most severe kind of wear. These strips are thoroughly kiln-dried before being manufactured into the standard finished sizes, and when they are properly laid there is never any separation of the pieces. One constantly observes that hardwood floors in dwelling houses, stores, etc., two or three years laid are open considerably at the joints, forming a resting-place for dirt carried in from the street, and also for water during the scrubbing process, but with the tight joints which British Columbia fir gives this unsatisfactory feature is avoided.

Western red cedar, Western hemlock and sitka spruce for boxes.

Practically every mill manufacturing flooring in British Columbia has dry-kiln facilities, and the uncleanly results produced by using poorly-seasoned flooring are thus reduced to a minimum. Owing to freedom from twisting in the drying process, fir flooring can be manufactured in long lengths, and its straightness makes perfect matching the rule rather than the exception, so that the finished product is a flooring easily and cheaply laid, superior to all others in point of cleanliness, taking a high polish, which gives a most attractive appearance, and offering resistance to wear little inferior to that of higher-priced hardwoods.

British Columbia fir flooring strips are practically free from knots, and in the first grade, known as Nos. 1 and 2, there are practically no defects whatever, except an occasional piece of bright sap, which does not impair the board for the use intended. In the second, or No. 3, grade a few slight defects are permitted, but there is a marked absence of knots, the defects consisting mainly of sap or small pitch pockets. It will be readily seen, therefore, that the best grade of edge-grain fir flooring can be laid without the necessity of cutting out any defects and the completed floor will present a handsome, smooth surface. While this wood takes and holds paint readily, on account of the beauty of the coloring and grain, it is usually finished in the natural state, being stained to any tint desired.

Although somewhat inferior from the point of wearing quality, fir flat-grain flooring possesses attributes which make it more desirable and popular than a great many of the other soft woods. The term "flat-grain" itself is somewhat of a misnomer, in so far as it applies to this grade of flooring, as it actually contains a larger proportion of what might be termed "angle-grain" boards. The standard classification provides that edge-grain shall consist of strips having a grain angle of 45 degrees or over, everything below 45 degrees being classed as flat-grain, which, therefore, contains a larger proportion of angle-grain than really flat-grained stock. The absolutely flat-grain stock should not be used when exposed to severe wear, but gives good results when covered by rugs or oilcloth, or when placed in such portions of the floor where there is a minimum amount of actual contact. The angle-grain, however, comprised in this grade has a strong, durable surface, similar to the edge-grain, though not so closely set.

While British Columbia fir is a soft wood, in point of actual hardness it is superior to many of the hardwoods, and particularly when sawn-edge grain its resistance to wear entitle it to be classed rather with birch and maple than with spruce and pine.

For Interior Finish and Furniture

By E. H. Newton

There was a time when the people of Eastern Canada thought they had to import a Southern product for interior finish, as well as for the manufacture of sash, doors, panelling, and other factory work. Now we find that we have in Douglas fir not only a better wood for these uses, but one that takes the place of hardwoods in the manufacture of furniture, turning out furniture pleasing in appearance and substantially correct in every particular. There is no more beautiful wood grown than Douglas fir, when the necessary skill has been applied to properly bring out the grain. For any of the uses which I have named, in the interior of a house or in furniture, it is next to the last word in perfection.

When the furniture and fittings were under discussion for the then projected British Columbia University it was thought that much of the wood for this work would have to be imported in order to get the desired effect. Douglas fir was given the proper treatment to prepare it for the specific purposes, and samples were submitted to the proper authorities for consideration, and, while the architect had indulged extravagantly in the most enchanting dreams of idealty, yet it was found that they did not portray anything more beautiful or suitable for the purposes than Douglas fir, and consequently it was finally chosen.

To bring out the best finish on fir it is essential that the drying process should be as nearly perfect as possible. The lumber should be dry enough, but not too

Testing small clear specimen of Douglas fir at Forest Products Laboratories, Montreal.

dry. Rapid drying is not to be recommended, as it is not in the nature of things that lumber can be dried in a few hours with any degree of uniformity. It is more likely to be case-hardened on the surface and too much moisture left inside. Lumber dried in this way will not take a good finish, nor will it keep its shape after it is finished. The drying process requires a great deal of study, taking into account all the local conditions, and the kind of lumber to be dried, and for what purpose it is to be used. I have seen lumber come out of an improperly-designed kiln with an apparently perfect surface, but when the piece was cut in two it was found to be so badly checked open in the centre that it was worthless. This should not be so, and will not be so if the drying process is correct.

The uses enumerated above are not all the uses to which Douglas fir is being put. The wooden ships which are attracting so much attention, and which are being built by the score on both the Atlantic and the Pacific Coasts at the present time, are all being built of British Columbia Douglas fir. We have other beautiful timber here in British Columbia, of which the well-known British Columbia red cedar shingle is a sample; but, as Douglas fir is the king of the forest, I have confined my remarks to it.

We have met with many workmen who, when shown their errors, will deny right off-hand they ever made them. It seems as if they thought a lie would right the wrong, whereas, in reality, it only makes them appear ridiculous.

Making Phonograph Cabinets and Furniture

Describing the Operations at the Toronto Furniture Company's Plant—Machine Room Arranged on Square Plan—Modern Equipment in Every Department

Staff Article

The large modern plant of the Toronto Furniture Company is located on Dufferin Street, Toronto, in close proximity to the grounds of the Canadian National Exhibition. The company at the present time, in addition to their line of high grade furniture, is turning out cabinets for several manufacturers of talking machines. The size, layout and equipment of the plant is such that a great quantity of work can be handled economically and expeditiously.

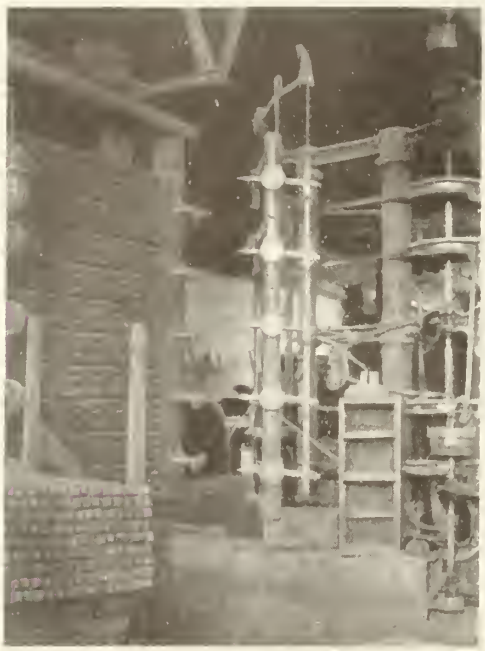


Fig. 1—Legs for phonograph cabinets are shaped on Moore carver.

The lumber, after being dried in a Grand Rapids vapor dry kiln, is taken directly into the machine room and placed convenient to the cut-off saws. The track to the machine room is below the floor level a sufficient distance to permit all of the lumber being readily removed without the sawyer having to climp up on the car. After being cut roughly to sizes, the stock is routed according to the operations it is to receive. That to be glued up is placed on the elevator and transferred to the basement to the Billstrom glue clamp carrier. This machine, according to the testimony of practical men, is one of the most useful inventions that has ever been adopted in woodworking plants. The arrangement of the clamp, glue heater, glue roller and table for assembling stock in the Toronto Furniture Company's glue room is shown in Fig. 2.

The veneer room and veneer storage are also located on the basement floor. This department, however, is worthy of an article in itself and is described fully in the veneers and panels department of this issue.

It will be noticed from the accompanying photograph, Fig. 4, that the machine room is laid out on the square plan. The machines, with the exception of a few small ones located where they are most convenient for use, are arranged in two rows, the whole length of the machine floor. Owing to the width of the building this arrangement allows ample truck space at each machine and still leaves a clear aisle for trucking of stock.

The equipment of the machine room comprises a Jackson-Cochrane three-drum sander, Porter Machinery Company double boring machine, P. B. Yates No. 229 travelling table double cut off saw, Cowan Company drill, Falls Machine Company glue jointer, Jackson-Cochrane multiple five-spindle boring machine and two cut-off saws, besides the following machines manufactured by the American Woodworking Machinery Company, for whom the Garlock-Walker Machinery Company, Toronto, are agents; resaw, 2 surfacers, jointer with feed attachment, 2 power feed rip saws, Nos. 0 and 2, 2 moulders, single end tenoner, double cut-off saw, variety saw, bandsaw, drill, shaper, jig saw, 2 universal saw benches with double protractor attachment. The power for operating the machines is furnished by a Goldie Corliss engine.

The superintendent of the plant, Mr. H. Dickson, has his office at one end of the machine room, with a door communicating with the main office.

After all the necessary operations have been fin-

Fig. 2—Billstrom glue clamp carrier and table for stock.

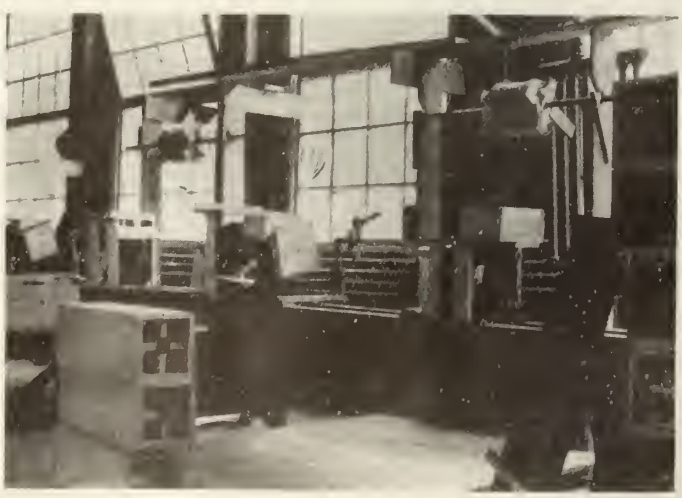


Fig. 3—Showing how wire bands are put on Bethlehem shell boxes.

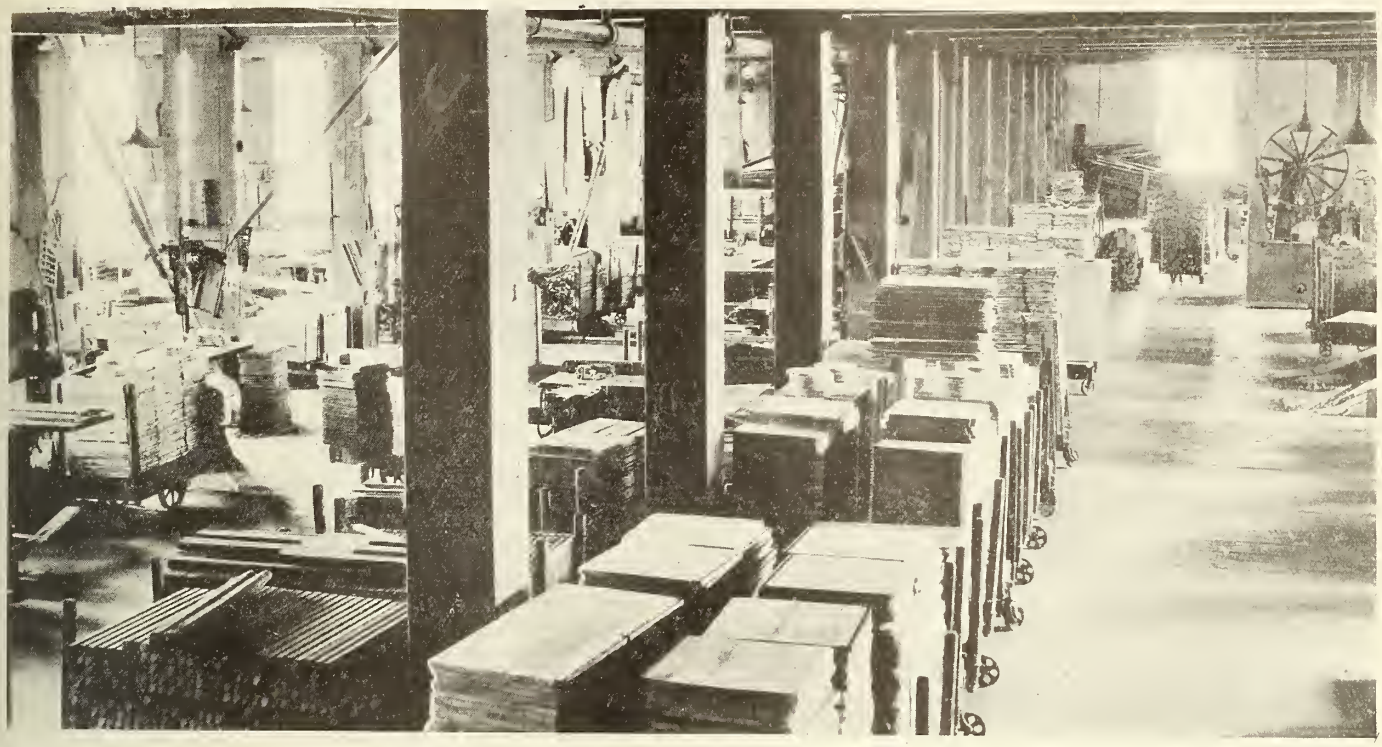


Fig. 4—Section of machine room at Toronto Furniture Company's plant.

ished to the stock in the machine room, it is taken to the cabinet room on the floor above. The cabinet room contains the following machines: belt sander, Wysong and Miles belt sander for sanding edges, American Woodworking Machinery Company disc and drum sander, and a Moore Carver. This latter machine has been found particularly useful for roughing out the legs for phonograph cabinets. To operate this machine it is only necessary to have one leg shaped out as a template or guide, after which a number of legs can be placed in the machine and made to the same shape as the template or guide. The illustration, Fig. 1, shows this machine with a truck load of legs ready to be carved. At the time of our visit the cabinet room was literally packed with phonograph cases in various stages of construction. Fig. 5 shows only a small section of the cabinet room, but, as it is representative of the whole floor some idea can be formed of the number of these cabinets being turned out.

The same attention has been given to efficiency methods in the finishing room at this company's plant as in the other departments. Shellacs, varnishes, etc., are applied by the Aeron system, two of the DeVilbiss Mfg. Company's machines being in operation. Both phonograph cabinets and high class furniture are finished by the spray method. The Toronto Furniture Company's manager, Mr. Kennedy, in discussing the Aeron system stated that in their factory it does the work of about five men. All stock after being coated is dried in a varnish drying room, for which the International Varnish Company, Toronto, are selling agents.

Besides their large furniture plant the company have a building which was erected some time ago to take care of contracts which they had secured for making shell boxes. At the present time they are working on an order for the Bethlehem type boxes. The shell box shop is a complete woodworking plant in itself. Power is supplied by a Goldie Corliss engine. The necessary machines are in use for cutting up the lumber, such as cut-off saw, power feed rip saw, surfacer, etc. Then there are nailing machines for nailing up the boxes.

Fig. 3 shows how the wire bands are put on the

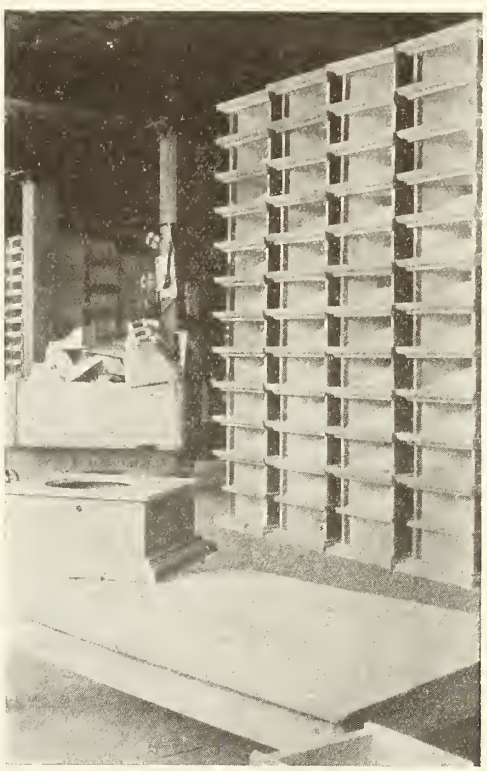


Fig. 5—A stack of small phonograph cases at the Toronto Furniture Company's plant.

Bethlehem boxes. Pattern makers' lathes that were formerly used for another purpose are used to hold the boxes secure. The coil of wire revolves on a piece of piping secured at the back of the machine. The box is revolved in the machine by hand.

Blower Pipes for Woodworking Machines

Must Have a Capacity Sufficient to Properly Exhaust Shavings and Dust—Designing and Fitting of Hoods Requires Experienced Man

By J. S. K.

Designing and installing a blower system is no amateur's job, and the manufacturer having his plant equipped with one should take precautions to see that it does the work effectively before settling the account. There will not likely be any trouble if the installation is made by a reliable firm specializing on blower systems. The writer once had occasion, however, to swear at some work that was put in by just such a firm. It was not a complete installation, but just one new machine (a planer) that had to be connected up to the existing system.

The work was done while the machinery was shut down for stocktaking, and as it looked like a first-class job the bill was paid immediately. After the planer was started, it was discovered that the blower took practically none of the shavings or dust away. The firm that installed it was called by 'phone and told about it. They sent the same man back to examine it. He tinkered with it for awhile and then pronounced it as being alright. But it was not alright, and when the company was informed about it they sent the same man back again. After three visits it was just as bad as ever, so the manager decided to try someone else.

He therefore called in a tinsmith that had done a few odd jobs around the factory from time to time,

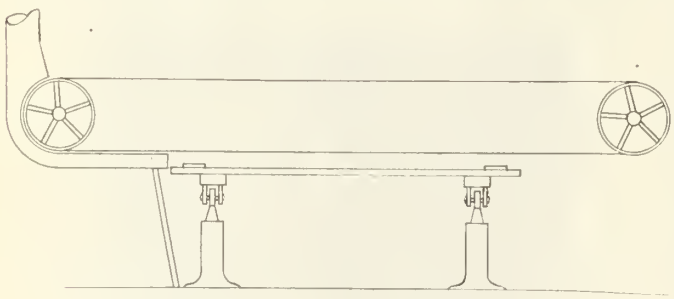


Fig. 1—A hood for a belt sander.

and who appeared as if he knew a little more than just soldering a couple of pieces of tin together. He sized up the machine and went away to his shop, saying he would be back again before quitting time. He was, and when he was finished with the job, it was a job. The whole trouble was that the first man had provided too small a pipe.

Some time later the manager was called on the telephone by the company that sent the first man, and they explained that they had fired him after he had "fell down" on two or three other jobs. They also said that if the blower still refused to work they would gladly send another man to fix it.

While they probably redeemed themselves with the manager, it would have been better to have sent a different man, at least after they had received the second complaint. The moral, then, is to be sure the job is satisfactory before you pay for it, because you never know when a reliable firm is going to employ an incompetent man.

Below is a table of the sizes of pipes which have been found satisfactory for all ordinary purposes.

Pipes for ordinary machines, such as saws, planers, matchers, tenoners, etc.:

Saws	Diam. of Branch Pipe
Rip	
Cut off, 18 in. diameter or less	4 in.
Split,	
Swing,	
Bracket, 18 in. to 24 in. diameter	5 in.
Groove,	
Heavy cut off saw 24 in. to 42 in.	6 in.
Band saw	4 in.
Band Re-saw ¾ to 1 inch	5 in.
Band Re-saw 1½ to 2½	6 in.
Planer knives 10 in. long	5 in.
Planer knives 14 in. long	6 in.
Planer knives 24 in. long	7 in.
Matcher heads, each	5 in.
Door Tenoner	5 in.
Sticker machines, each head	5 in.
Sand drum, 30 in. long	6 in.
Sweep-up	7 in.
Heavy timber planer each head	7 in.

Where branch pipes are longer than twenty feet or have an excessive number of elbows they should be increased proportionately in size. When the work is light and the branch pipe short, smaller connections can sometimes be used. Moulders, buzz planers, pony planers, jointers and all other machines having knives or saws of dimensions given, will require pipes of the respective diameters given in the table. Timber planers require twenty-five per cent. larger pipes than ordinary planers.

Fitting of Hoods

There are two reasons why hoods should be fitted properly. First, if they are not properly fitted, the blower will not serve its purpose, because the dust and shavings will escape and make it disagreeable for the operator of the machine and the off-bearer. Second, if the blower does not take the shavings away they will stay in the machine and be carried around by the feed rolls, thus making unsightly marks on the finished lumber.

It is impossible to get good service from any blower system unless the hoods are carefully and properly fitted to the machines. This is a job that should never be placed in the hands of an inexperienced man. Either some person who specializes in this class of work should be called in to do it, or else the manufacturers of the machines themselves should be asked to equip them with properly fitted hoods before they send them out. The latter is probably the best way, as some of the machinery manufacturers are making a point of fitting hoods to their machines. For the woodworking plant located in a small town where it is not easy to secure skilled help of the right kind this should be a great convenience. Sanding machines in particular should be equipped with well fitting hoods. As a rule it is an easy matter to provide a drum sander with hoods. In fact most manufacturers furnish them with the machines. Belt sanders cannot be too well

equipped in the matter of hoods, because an operator of one of these machines cannot get away from the dust.

The writer has a dim recollection of the first belt sander that was installed in the factory. One man after another in the shop absolutely refused to run it on account of the dust. At last one of them ventured and he approached it with a damp sponge tied around his nose and mouth, something on the principle of the gas helmets our soldiers are wearing in the trenches. After a great deal of tinkering and fitting, a fairly effective blower was designed. Then, when three other machines of the same breed, designed for different work, were installed beside the first one, the dust was awful.

It is impossible to get a blower that will work effectively on a belt sander under all conditions, but methinks some of the manufacturers of belt sanders would make a big hit with the men in the shops if they were to do some experimenting. They would succeed in getting some good boosters for their machines. The accompanying illustration, Fig. 1, shows a hood that worked fairly well on one type of belt sander. The flat part under the belt has the sides bent up about an inch, and has a support reaching to the floor which can be adjusted to suit stock of different thicknesses. The idea is to keep it level with the stock and between the draught caused by the travelling belt and the suction from the fan there is not much dust left lingering around.

More About the Operation of the Moulder

First Article Appeared in January Issue—Quick Set-ups for Detail Work Discussed Here—Action of Centrifugal Force on Sticker Knives

By S. E. Saunders

Considering the fact that it is necessary to have the cutters or knives in running balance before they are bolted to the head, or, in case they are out of balance to provide the counterbalance while the stickerman has access to the balances, a word or two on this branch of the subject may not be amiss.

It should be unnecessary to state that no stickerman can do satisfactory knife work without a good pair of plate balances. If knives are made for short detail runs it is better to make only one of each section required, and balance with others, already on hand; but it often occurs that none of those already in stock will balance accurately with the new one, and this is where the counterbalance saves time and emery wheels. The best small counters are made from the heads and stubs of wrecked head bolts, and it is well to keep a few of these on hand.

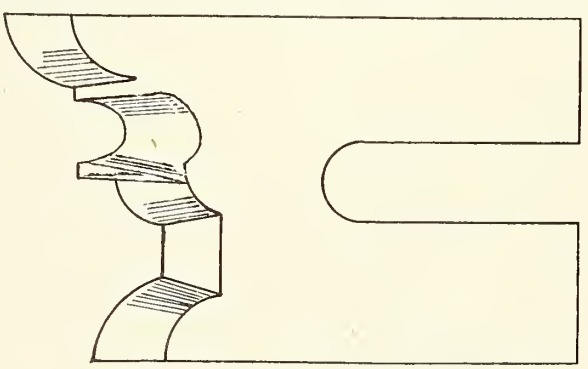
In case one knife is considerably heavier than the other it is best to select two counters and place one on each side of the light cutter, for the operator must not forget that knives will run out of balance if they are not in line on the head, no matter how nicely they behave on the scales. A stickerman should be familiar with a few of the laws of physics which govern centrifugal force and know that the part of a knife that projects two inches from the head will throw with twice as much force as the portion that projects but one inch.

It follows from the above statement that if a counterbalance is put in the slot to counteract the weight of the knife projecting some distance from the head, the counter must be considerably heavier than the requirements shown by the scales. The same condition is met with when using a balancing knife that must be set back as far as possible to prevent cutting the pattern; and for this reason the balance must be a little heavier than the pattern knife.

Stickermen operating large machines will notice that quite a little variance in the weight of cutters and bolts is permissible when the knives are small, on account of the comparative size and weight of machine or head; but on the smaller machines it is best to be very particular in balancing. Knives made for stock patterns should be in pairs, exactly alike, and for stock moulds where the longest runs occur. Where each run must duplicate the preceding one in shape exactly, it is advisable, if at all possible, to procure a solid head with four cutters. There should be four knives to cut instead of two, as feed can be doubled in that way if other conditions are favorable. Some men say that it is impossible to set four knives to cut alike, but they are usually men who have trouble to make two knives cut alike.

In the article published in the January issue of the "Canadian Woodworker" the making and tempering of knives was touched on, but it is so broad a subject that I feel a few further suggestions to the studious apprentice will not be out of place.

Let us discuss in detail the making of a moulding knife. After selecting suitable blanks for the work in hand the operator must decide for himself where he is going to make the moulding to secure the best results; very often a knife ground to cut a mould on the top head will not work on the side or bottom heads. This opens up another question that I have often heard



Showing how to bevel sticker knives.

thrashed out among practical men: "Whether is it better to run 'face up' or 'face down.'" I say, make your knives to use on bottom or side and run "face down." We must admit, however, that some moulds must be run "face up," as there is no other way to make them.

After deciding which way the mould is to be run sketch the knife pattern roughly on the blank. This sketch need only be off-hand, as the true pattern will be on the scale. The principal point to be watched in roughing out knives is to avoid grinding over the finished lines; for if these lines are encroached on it

is necessary to grind the whole pattern deeper into the steel. In the process of roughing out, the surplus steel should be ground off on the bevel, for, on coming to the finished line, it will be much easier to grind or file to the perfect pattern, as you will be grinding straight across.

When a knife is ground with a feather edge it is impossible to tell to a 1/32 of an inch where the finished line will be when it should be ground sharp, without turning the edge, and the same precaution should be followed when grinding knives merely to sharpen them. The accompanying illustration will show the reader the proper manner in which to slant the bevels for rounds, coves, rabbets and quirts. As I think these in combination comprise nearly the whole list it will not be necessary to dwell further on the subject.

I think readers will agree with me when I say that in making a mould for the first time we are not always fortunate in getting our pattern right "straight off"; we are usually compelled to make several changes and stops, spoiling material, etc. Therefore, when the knives are cutting to the pattern satisfactorily, a card should be taken off the head, numbered, and filed away in some way so that when the same pattern is required again it is a simple task to place knives back on head to the lines as before.

A smooth, thin piece of board, say one-eighth inch by two inches by the length of head, having the cutting line the same as the scale, is placed against the head and the position and pattern of the various knives marked on with a very sharp hard pencil. This being done, have the board given a coat of shellac to keep it clean, and put it away until required.

I propose to furnish the readers of this journal with two further articles, namely, "The feeding of the sticker," dealing especially with the work of a sash and door factory, and "Sticker troubles and how to remedy them." If this little series is successful in enthusing some brother who is drudging along the byways, and by some little suggestion given, enable him to run along the highway of success, my purpose will have been accomplished.

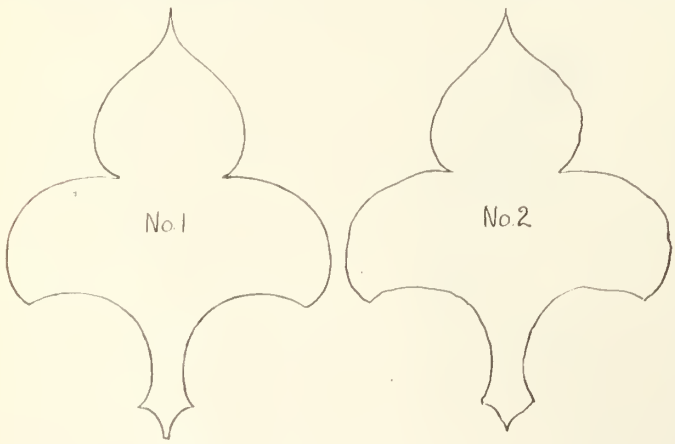
Practical Methods in the Furniture Factory

Continuation of Series of Articles—Importance of Having Good Marking Patterns and Scroll Sawyers—Illustrations Show Some Common Faults

By W. J. Beattie

The band scroll saw is one of the indispensable machine tools of the furniture factory, and on that account is very frequently much abused, in ways that it is not necessary to enumerate here. The bandsaw is a French invention, and the best bandsaw blades are of French manufacture. The French were the first to manufacture a blade that is wedge shaped, being thicker at the cutting edge and tapering towards the back, for narrow saws. A saw of this kind does not need setting, and produces very smooth work.

A real good band sawyer is one of the hardest kind of machine men to get. There are men who can fit



Examples of good and poor band-sawing.

up a saw to perfection, keep their machine in good order, and yet turn out a very indifferent quality of work. It may be sawn smoothly enough and the quantity be reasonable, but there are more things than that required of a good sawyer. Band sawing is a combination of mechanical skill and artistic taste, in contrast to machine work that requires only mechanical precision.

The bandsaw man requires a good eye for "line;" that is, if a curving line is not true he should be able to detect it, and if the pattern has been carelessly sawn, he notices the defect and has it remedied, and does not simply follow the line regardless of results.

The drawing from which a pattern has been taken may be perfect regarding curves and sweeps, but in transferring to the pattern material a slight deviation may occur. The pattern is sawn, perhaps, to increase the departure, the result being to spoil the harmony of the design. The merely mechanical man will 'hew to the line, let the chips fall where they may;" the man with the "eye for line" will call attention to it and have the thing righted.

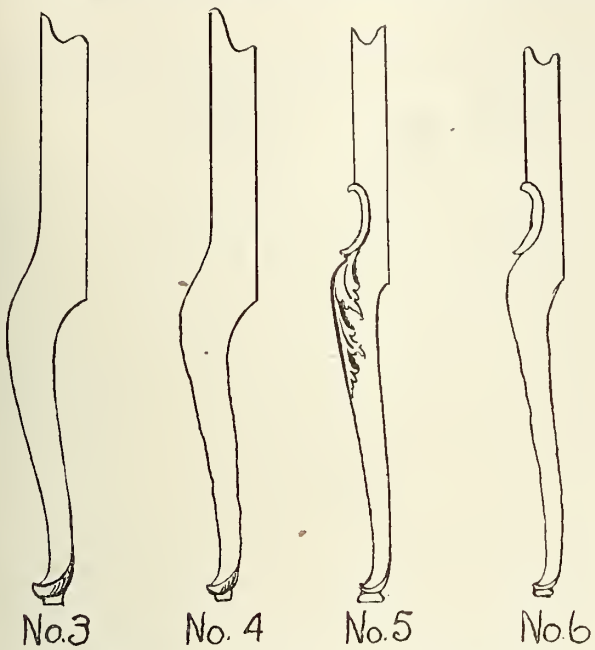
The writer has had experience with quite a number of band sawyers, and one whose first name was "Jimmie" was the "Crack-a-Jack" of the lot. When it came to seeing anything wrong with curves, etc., he was the one who never missed. Needless to say, his work was always top notch quality.

For speed and average quality, a man in one of the furniture centres of Ontario had anything beaten that I have yet encountered. The way he could fly around curves or any kind of shapes, was an eye opener. He could do easily fifty per cent. more work than a fairly good man, which means about nine out of ten experienced band sawyers. He had not the "finish" of the first mentioned man, but was one of those exceptional men that are met with in the course of factory experience.

It would appear that the proper way for a man to do, who wishes to become a good band scroll sawyer, would be to train his eye and hand by drawing scroll shaped lines and patterns at every favorable opportunity, and thus be able to not only see defects when they exist, but be able to remedy them as well. If a pattern or shape is poorly bandsawed it is generally made worse, rather than better, by the man who does the edge sanding, as he is not, as a rule, supposed to know that the lumps and hollows are a defect, and he

simply smooths up the edge and considers his part of the work complete, which in reality is quite correct.

The writer submits a few scroll patterns, the lines of which are correct enough to show what is meant, and what the same things very frequently look like



How Queen Anne legs can be spoiled by band-sawyer.

after being bandsawed. It is always well to show a correct and an incorrect result, and to make a practical demonstration, so that the reader can easily see the point aimed at. No. 1 is a bandsawed form reasonably correct in outline, and if sawn as shown there would be no cause for complaint. No. 2 is the same thing badly sawn. The actual difference, if one was laid on top of the other would be small so far as space is concerned, yet the result is bad enough. No. 3 is a bandsawed foot on Queen Anne lines. No. 4 is the same pattern badly bandsawed, and leaving a lot of after correcting to be done, which will partly redeem it, as there has been too much wood cut away in places. No. 5 is along the same lines, and the same comment holds good on No. 6 as on No. 4. No. 7 is

Showing how pieces for spindle carvings are sometimes sawn.

a piece of bandsawing for spindle carving. No. 8 is the same thing, as some would saw it.

To some readers the even numbers may look like exaggerations of bad work, but such results are far commoner than one might think. It is only necessary to go into a furniture wareroom that carries a varied stock of goods, and if you have an eye for "screams" you will be lucky if you don't find worse examples. This article is meant to impress the great necessity for having or making good scroll bandsawyers, as many of our good men are away working on the curves of salients, said curves having a decided bend towards the Rhine, and are even more important to us than the factory requirements enumerated above.

Questions and Answers

Question: Can you put us in touch with the manufacturers of some woodworking machinery capable of polishing the top and about ¼ inch down the side of a wooden cap for a wooden pill box about 1¼ inch in diameter in which we pack one of our preparations. —Northam Warren Corporation, New York, N.Y.

Messrs. Schimmel, Reid & Co., Faribault, Minn., say: We have a machine which has been used on this class of work.

The J. A. Fay & Egan Co., Cincinnati, write: The best and quickest machine for finishing and polishing the wood caps for a pill box would be the head of a small lathe. By putting a proper holder in the spindle you can finish them as fast as you can pick them up. If the parties have the proper machine for making them they could be made and finished at the same time. In other words, they need not use a special polishing machine, if they are made properly, as it is all done at the same time. We are enclosing a bulletin showing our No. 79 college wood lathe and the head stock for this tool would be just the thing for polishing these wood caps.

Question: Can you tell us where we can get nickled corners for glass silent salesmen.—W. H. Turner, of Turner, Brown & Haley, Moncton, N.B.

Answer: Nickled corners for glass silent salesmen can be obtained from: Vokes Hardware Co., Toronto; Weber-Knapp Co., Jamestown, N.Y.; Foster, Merriam & Co., Meriden, Conn.; The Burns & Bassick Company, Bridgeport, Conn., and Garden Plating Co., Ogden Blvd., Chicago.

Question: Can you tell us from whom we can purchase a graining machine for making imitation oak.—Cluff Mfg. Co., Vitro Tank Mfrs., Toronto, Ont.

Answer: Graining machines for making imitation oak can be obtained from the Garlock-Walker Machinery Co., Ltd., 32 Front St. W., Toronto, and from the Posselius Bros. Mfg. Co., Detroit, Mich.

Question: We wish to get some Jacobean turning done and have not sufficient to warrant us putting in the special machine for that purpose, so thought you might be able to tell us where we could get it done.—Subscriber, Woodstock, Ont.

The name of the subscriber may be obtained from the Editor.

Make Surroundings Attractive

There are instances where a man's work and the surroundings are so attractive that he would rather be at work than not, but this condition is not general, nor will it ever be. Still, by keeping this ideal condition in mind, we may work nearer to it from time to time.

System in the shop is a great thing, and should be encouraged till it gets to a point where it threatens to interfere with brains, and then it is time to put a check rein on it. Brains will beat system any day, and they should never be made a sacrifice to it.—Hardwood Record.

Upholstering and Trimming

The Manufacture of Upholstery Leather

Editor's Note:—The following article, explaining the processes used in the manufacture of upholstery leather, together with the illustrations, is published by courtesy of the Lackawanna Leather Company, of Hackettstown, N.J.

Hides suitable for manufacturing into upholstery leather are sold to the tannery in a wet, green, solid condition, by the pound, with eye holes, nose, lips, ears and long shanks still on them. They are trimmed by the tanner, converted into leather and sold when finished by the square foot. Summer and early fall kill of cattle produce the most desirable hides. Hides from this period have shorter hair than winter and early spring cattle, are more plump and are generally free from grub holes.

The spread of the hides across the shoulders, just back of the brisket is sold to measure 6 feet 6 inches and over on stuck throat hides (Gentile slaughter) and 6 feet 8 inches and over on cut-throat (Kosher slaughter), the cattle themselves usually weighing 1,300 pounds and up on the hoof.

The trimmings which are cut from the hides consisting of eyes, lips, nose, ears and shanks below the kneecap, are used for sole leather and harness leather. Upholstering leather must be closely trimmed as the

Splitting the hides.

parts mentioned above make poor upholstering leather and at the same time cut to considerable waste.

After the hides have been trimmed the next operation consists of placing them in large pools of clear water. The water frees the hide from salt and dirt and softens the texture. The next operation consists of removing the fat. The liming process comes next. The hides are placed in a lime bath where they are raised and lowered to give the lime solution a chance to equally affect all parts. The action of the lime is to swell the hide and to soften or dissolve the fatty hair roots, so the hair will slip out of its cell easily. The hair is not shaved, as many suppose. The time required to lime a pack of fifty hides is seven days.

The next operation is removing the loose, fleshy material on the meat side of the hide. A special machine is used for this operation. After the fleshing machine operation, the hides go through what is known as the bate process. This consists of: 1st, washing the hides in clear water; 2nd, treating them to a bath containing chemicals which have a bacterial action on the hide, loosening up and freeing the lime from the hide; 3rd, the removal of these bacterial action chemicals with large quantities of water. Special appliances are used for these purposes. The time required for 50 hides varies from three to five hours, according to the thickness of the hides.

The Bate Operation

After leaving the bate operation the hide is substantially in the same condition as it was when received from the butcher, excepting that it is minus fat, flesh, hair and dirt, and is now ready to receive the primary stages of tanning. The hides are next suspended on a pivoted frame over the tanning vats ready to receive the first or mild tan liquor, and each day the tanning strength of this liquor is increased until on the eighth day we have no longer a green hide, but leather. This leather is not thoroughly tanned through and through, but is sufficiently advanced in the tanning process to allow it to be put in condition for the splitting machine. The pivoted frames upon which the hides, fifty in all, are hung, are always in motion, agitating the hides and the liquor, resulting in quicker tan liquor penetration than if the hides hung stationary. This style of tanning vat is known as the rocker.

When the leather is taken from the rocker vats, it is necessarily very wet, in fact, dripping wet, and must have a certain portion of this water taken from it before it can be split. To accomplish this, and without the necessity of putting the leather out on a clothesline, a wringing machine is used. This machine accomplishes the work more by absorption of the heavy felt rolls, than it does by pressure. When the leather has passed through the wringing machine the next operation is that known as stoning. The stoning machine irons or stones out the wrinkles, flattens the leather and is the final preparation for splitting.

The splitting machine is shown in one of the accompanying illustrations. An endless belt knife of flexible steel 3 inches wide, 1/32 of an inch thick, travelling at a speed of 475 feet per minute, kept sharp by the edge passing through two emery wheels continuously grinding, splits the hides. A steel shaft 2 inches in diameter and 106 inches long, styled the gauge roll, gauges the thickness of the split to be taken off. The distance from the bottom of the gauge roll to the edge of the knife is the thickness the leather will be split. Ring rolls 2 inches in diameter with 1-inch face, of which there are 106 resting on a 6-inch rubber roll 106 inches long, hold the leather against the gauge roll. Due to the flexibility of these ring rolls they act quickly on the uneven parts of the hide.

The rings sink into the rubber rolls at heavy parts and are forced up themselves by the rubber roll at light parts of the hide.

To the lay mind the splitting of the leather is probably one of the most interesting features of the leather business. To the tanner's mind it is one of the most sensitive. Thousands of dollars' worth of damage can be done in the splitting machine in a very few minutes. Not only can a poor adjustment of the machine produce leather irregular and poorly split, but there are other causes over which the tanner or the belt knife operator has absolutely no control, which go to make No. 2 or damaged leather at the splitting machines. One of these is a lead shot which the animal may have received from trespassing on someone's property, not easily distinguished because it is part of the way in the hide and the sore has healed up. If the keen edge of the knife strikes this shot dead centre the damage effected is very slight, whereas if the knife happens to strike the shot on the slant, the edge being very keen and long and flexible will either be turned up or down. The gap in the knife is liable to cut either the buffing or the machine buffed hide in two parts. Thorns will cause this same damage. In the buffing operation, due to the fact that the buffing is so extremely light, the slightest trace of grit on the grain side will cause damages to the buffing by cutting it in two, and the machine buffed hide itself may suffer from scratches.

Making the Splits

Leather can be split any way you desire it. You have a certain thickness of hide and you can make two, four or twenty-four parts, as you like. The questions that always come up are: 1st, are they saleable, and 2nd, will these different parts have sufficient strength when you take an excess number of pieces from one hide. Splits when put through a splitting machine at the proper substance are strong and pliable enough for the purpose they are intended, and that is for plain work on medium priced goods, flat seats for dining chairs, slip seats or linings. This company does not guarantee splits for tufting purposes, any grade that it makes.

A few years ago some of the manufacturers of upholstery leather used soluble gun cotton, commonly called dope finish, on their splits. This highly inflammable material was not satisfactory. It had no wearing qualities as compared with linseed oil, and those who used this dope finished leather had considerable trouble with it. It might be safely said that all patent and enamelled leather manufacturers of upholstery leathers are using linseed oil.

The first cut taken from the hide is called the buffing. It is an extremely thin piece of leather and suitable only for pocket books, jewelry and camera case coverings and book bindings. The second is the most valuable and best product, the machine buff hide; third, the main split; fourth, what is known as the second splitting, or extra split, and then follows the leveller split, commonly called slab, which is the uneven part of the steer hide, and is not used for furniture leathers, but usually for inner soles for shoes, horse collars, etc.

After leaving the splitting machine the different parts are now ready for the next operation, which is called re-tanning. It is really the finishing out stage of tanning commenced by the rocker vats. As the hide is split into thin sheets it necessarily follows that quicker results will be obtained in finishing the tanning process. To accomplish this re-tanning, the splits and machine buff hides are placed in what is known as paddle wheels, containing tan liquor. The wheels, when in operation, compel the hides to float continuously.

After the re-tanning process all the product, with the exception of the buffing and the slab, are turned over to the scouring and sumacing process. Scouring consists of rinsing the different parts of the hide in water and then passing them through a scouring machine that frees the pieces of leather from the surface tanning. The second operation in this process is to submit the different parts to a sumac bath. Sumac is the leaf from the sumac tree ground to a powder,

Drying the hides after they have received the first coat of linseed oil.

boiled, and something like a tea drawn from it. The different parts get the sumac process from two to three days. This has an action on the leather of bleaching it, brightening its color, and as there is considerable tannin in the sumac of a very soft nature, it helps to add pliability to the leather. Sumacing is done in boxes and also in paddle wheels.

Lubricating the Leather

The next process is that of lubricating the leather, known as stuffing. The different parts receive a coating of cod oil and other greases which also have quite a lot of bearing on the pliability and strength of the leather. The surface water is squeezed out of the hide with a steel slicker and greases are applied to the flesh side on machine buffs and splits and to both sides in the case of top grains. Following up the process the leather then goes to what is known as wet tacking frames. After it has been tacked on the frames, the table which suports the frame is made to expand; this drives the frame to all four points. It is then bolted tight, stood on edge and allowed to dry. From the drying lofts the leather passes to the softening process. Two machines are used for this purpose. The leather is then ready for enamelling and is now styled "in the russet."

Deep buff is probably the most abused name of all the upholstering leathers. According to some, any split may with impunity be called a "deep buff." To produce the "simon pure" article the deep buff cut must be nearer the hair side than splits are, the accepted rule being that underneath the tipping grain (patent leather for ladies shoe tips) the only true deep buff is produced.

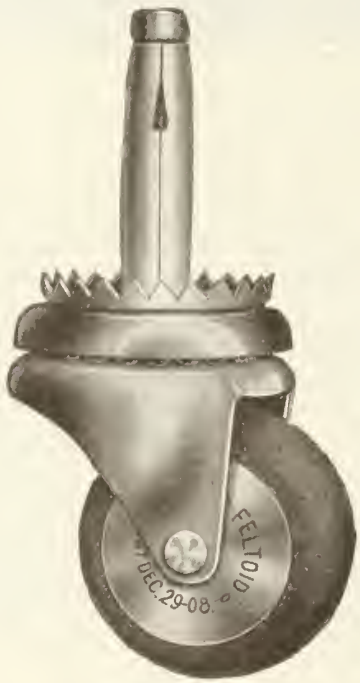
To do the enamelling the hide is tacked on a frame where it remains until it has had its several coats of linseed oil, varying from 6 to 8, according to the nature of the leather and the covering qualities of the col-

ors used. The boiling of linseed oil is a slow and tedious proposition. The various coats are boiled to different consistencies, the first coat material being as thick as jelly, whereas in the last coats the oil is thin and has about the consistency of molasses. One of the accompanying illustrations shows a yard full of leather which has had the first, or prime coat.

After the enamelling process, the leather goes to the embossing machines, where the impression is applied to them that gives the various Spanish impression effects. From the embossing machines the leather goes to the Spanish black coat room. This coat is first applied and then the high spots are rubbed off. The leather is then dried and is ready for a soft graining operation which is done with a cork arm board. The next operation consists of cleaning the leather on the finished side. It is then ready for the measuring machine. This machine, with five men putting leather through and carrying away, has a capacity of something like 350 hides per hour. After measuring and marking the leather is rolled up and placed in the bins.

Easy Running Casters

The caster illustrated on this page is known as the "Feltoid" caster, and is sold by the Burns and Bassick Company, of Bridgeport, Conn. It is particularly adapted for furniture that is to be placed in rooms



Feltoid caster.

with finely finished wooden, or carpeted floors. These casters are very easy running. The writer can testify to this point as his office chair is equipped with a set of them. The principal feature of the "Feltoid" casters are that the rollers are made of a specially treated material which will stand hard usage and yet remain soft so that they will not damage the floor or rugs.

Various types of these casters can be obtained, suitable for metal beds, pianos, chairs, case goods, etc. For chairs with delicate legs "Feltoid" tips can be secured. These tips are made of the same material as the rollers. They will slide easily on the floor and are more adaptable on some chairs as the legs are not of sufficient diameter to permit the use of socket casters.

Upholstered Furniture Manufacturers Meet

The thirteenth semi-annual convention of the National Association of Upholstered Furniture Manufacturers was held in Chicago on May 8th and 9th and established a new record in many ways for this organization. Fifty-six representatives from forty-two firms responded to the roll call.

Reports of the officers showed a healthy condition of the organization. Treasurer C. S. Kimmeth read his report, showing the finances to be in good condition, with a small balance in the treasury.

Secretary's Report

Secretary Maltby made his annual report. He has been especially active during the past year in connection with labor matters, having assisted in difficulties with the upholsterers in Baltimore, Philadelphia, Jamestown, Cleveland and Chicago.

Considerable progress has been made in the buying of various commodities for the members of the Association, bringing to pass the prophesy made by Mr. C. J. Kindel, six years ago, to the members that "if syndicate buying was good for furniture dealers it would also be good for the manufacturers." He also prophesied that after the Association had progressed far enough it could make use of such means in getting the best prices obtainable. This seems at this time to be very near of realization.

Further progress is reported in the matter of an Association label, following the lines of the Southern Cypress Manufacturers, American Oak Manufacturers and others who have made trade marks effective in stimulating their business. The matter is now in the hands of a committee who expect to have the label endorsed by the Association at an early date.

Reviewing the work of semi-annual audit of members cost accounting, a significant fact is brought out that practically all of the members made the standard of profit recommended by the Association during the past five years. No failures have occurred during the history of the Association; four firms outside of the Association had gone down during the past year.

Labor Troubles

The subject of labor conditions received prominent attention, as the drafts upon the labor market are at this time very heavy and steadily growing greater. The convention was addressed by W. J. Hueston, superintendent of the Gold Furniture Company, who recited wide and varied experience and exact conditions in reference to Chicago situations. Mr. J. N. Taylor, Secretary of the National Founders Association, gave an outline of that very successful organization in handling of labor union propositions. Mr. John J. Madeen, of Indianapolis, a city which has headquarters of more labor unions than any other city, there being at this time several million dollars of their money on deposit, told of the successful means that had been employed in handling such matters in their city.

Collective Buying

Collective buying came in for a large amount of attention and a proposition was received for handling one of the leading materials entering into upholstered furniture through the association's headquarters, and a committee is now making arrangements for what is estimated to be a large saving in this department. Already one of the items of filling has been tested out and found practical to be handled in this way.

"Safety First" Department

For the Bandsaw

It is a very easy matter when operating a bandsaw—especially if the light is not just what it should be—to lean forward and put one's face against the teeth of the saw. Perhaps you have never seen such an accident occur. But that is not saying it will not occur if the bandsaw is left unguarded.

Another dangerous thing about a bandsaw is that it is liable to leave the wheels and wind itself around the operator's neck. This accident has occurred many times. Some operators have got off with hardly a scratch; others have not been so fortunate. The bandsaw guard shown here is furnished by the J. A. Fay & Egan Company, of Cincinnati, Ohio, on their bandsaws. It is a good practical type of guard. It is substantial and covers the "danger zone."

Employers' Duty to Workers

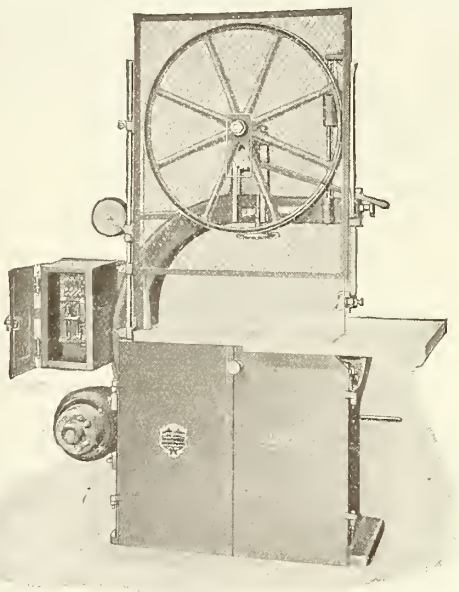
In affirming judgment in favor of an employe who was injured while feeding a molding planer, the Louisiana Supreme Court applies the principle that an employer is bound to furnish his workers with safe appliances with which to do their work, and to give them such warning of dangers as the circumstances of the particular case fairly require In this case it appears that a spring designed to hold strips against the guide of the machine had become loose, by reason of which the injured man was obliged to hold the strips in position by pushing. While doing this, one of the strips broke, causing him to fall upon rapidly moving belting negligently enclosed, with the result that before he could be released he was burned by friction.

Guarding Counter Shafts and Gears

In the May issue of the "Canadian Woodworker" appeared two illustrations showing how piping had been used effectively to guard the moving parts of machines. These photographs are along the same line, but I do not think they overlap at all. They show how the countershaft of the shaper and the gear wheels of the three-drum sander in our factory have been protected by piping constructed breast high.

It is impossible to estimate the value of having all moving parts of machinery guarded. Workmen move about their work with an assurance of safety. No man can concentrate on his work when obliged to watch his every movement closely so as to avoid bumping his arm against some dangerous cog wheel or protruding set screw. By adopting every practical "safety first" suggestion brought to his attention the manufacturer is not only protecting his employees, but adding to the efficiency in his plant.

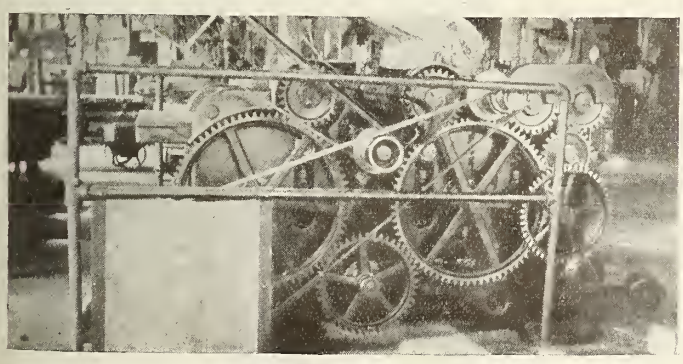
I think the "Safety First" department in the Canadian Woodworker is an excellent idea. Illustrations are shown of safety appliances in operation in various plants, which is a pretty fair indication that the ideas are practical. If every reader of the journal would contribute some suggestion, a wealth of ideas would soon be available. Men's thoughts run in entirely different channels. Thus it is always advisable to have the suggestions of as many men as possible.—A. Alexander.



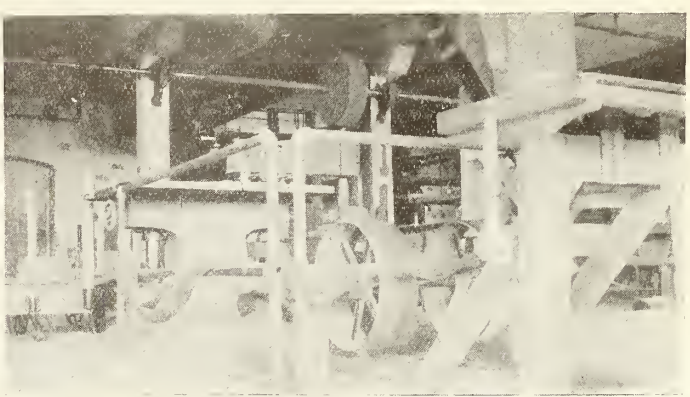
A guard for the bandsaw.

Labor, particularly skilled labor, is a commodity, the same as sugar or flour. Its value is equal to so much money, and the price paid for it should be regulated by its quality and the demand existing for it.

It softens the pain of making a mistake to be the first to find it out.



To prevent workmen getting caught in the gears.



Fencing in shaper pulleys and belts.

Staining and Finishing a Panelled Room

By James Culverwell

The staining and finishing of hardwoods being so extensive a subject I cannot touch on but a few points. These I trust will be of some service to readers. We have in this country some forty different kinds of oak, every one of which has its own particular use and purpose. But the domestic oaks, as they may be termed, are but few. There is the white oak, the rock oak and the black oak.

The three above named are all capable of being treated for household purposes. The white is the best and the black and red next in the order given. To touch on the staining and finishing of these woods we will take for granted that a dining room, about 14 feet by 20 feet, has been panelled with white oak from the floor to about 7 feet high, finished at the top with a heavy moulding forming a plate rail as well as doing service as a bold finish to the panelling below. The best method of staining oak is to fume with ammonia. In this case the panelling would be fumed in sections, the largest size taken and a room built of rough lumber, leaving a doorway and window.

The room should be papered out to prevent any escape of fumes. The panelling should be so placed that no piece lies against the other. Some strong ammonia should be placed in saucers and the door closed and papered around to prevent any escape of fumes. The window serves for inspection purposes. From eight to ten hours will be required, according to depth of color desired. When opening up the room care must be taken to allow the fumes to go off before entering. By taking a spare piece of the wood that was placed before closing the room up and rubbing it with a little oil you will find the depth of color attained. If not deep enough resume the operation. The above will give the best treatment obtainable for oak. There are many others but none give us the richness and clearness that is obtained by fuming.

For Panelling that is in Place

We will presume the panelling to be fixed and cleaned up ready to receive the stain. In this case the nearest to fuming is to apply the aqua-ammonia to the finished woodwork with a brush, repeating the application until the desired tone is attained and bearing in mind that two or three thin coatings is far more effective than one heavy or strong coat. This will keep the work clear and transparent. If used too strong it would make the oak work look painty and muddy, spoiling what would otherwise be a nice clean job. This applies to all staining, whether it be an oil, water, or spirit stain. This is a very important point in staining.

I will here touch upon a few of many other ways of staining oak panelling. A good antique can be obtained by staining the filler with equal parts of Vandyke brown and charcoal, using about one part of coloring to four of filler. The filler would be plaster whiting, silver white or some of the silica earths, of which there are many. A sixteenth century oak can be imitated by darkening portions of the panels in V shapes and streaks, but this is a style not much in demand. These shades are applied after the first stain is dry by going over the parts required to be darkened with a little stronger stain. Darken in the centre and blend out the edges. This is sometimes done by burning or scorching portions of the panel, styles and rails with a paint burner. After the burning has been done, care having been exercised not to burn the wood too much, it is cleaned off and filled with a filler stained with either Vandyke brown or burnt umber.

Care must be taken with the moulding to see that no filler is allowed to collect in corners, etc. Bichromate of potash dissolved in water also gives a good color to oak. This being in crystal form, however, it requires some time to dissolve.

There are many styles of oak. Bog oak is obtained by using a medium tone of color and giving a greenish tinge to the oak. This is similar to the weathered oak but instead of brown it has the greenish hue. Antwerp oak is much the same color as fumed, but darker. Flemish oak is more adaptable to furniture than panelling, being of a black nature. Tyrolean oak is a dark, rich color, with a green tinge. All stains must be applied before being filled. The fillers are stained to suit the color already applied.

Flemish Oak

Flemish oak is best obtained by dissolving one-quarter pound of bichromate of potash in about one-half gallon of water. When dry coat the whole of the work again with a little of the best drop black thinned down with turpentine, adding a small portion of Japan. Let this staud a few minutes before cleaning off. All stopping, such as small holes, must now be done by making the stopping to the same color as the stain. It is then ready to be waxed. For black oak use one ounce of nigrosene to one-half gallon of water. When dry fill with a black filler. A good stain is also made by washing the woodwork down with a solution of sulphate of iron, made by dissolving about 4 ounces of sulphate into a quart of water. Several applications should be given until the desired tone is acquired.

Another stain is to wash the oak with a concentrated aqueous solution of logwood several times. If not dark enough a solution of acetate of iron may be applied. Each coat must be allowed to dry before applying another. For a brown stain a solution of sulphuric acid diluted to the tone required. When dark enough the action of the sulphuric acid can be averted by applying liquid ammonia.

There are many other stains, but space will not permit dealing with them. We will now proceed to finish

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our room. After the application of the desired stain, oil, water or spirit, we find many light parts, such as a line of white or light down one side of a panel, style or rail. This has to be treated separately by toning down with a camel hair mop, either with the same solution that has been previously used or by applying some other suitable stain to bring it to the surrounding color. As many coats of this stain must be applied as necessary. As they dry some panels will require more than others. This will require care and a good colorist, but is necessary to bring all the work to the same shade. This having been accomplished the next is the finishing. The best finish is undoubtedly a wax finish. A thin coat of shellac may be applied here if so desired before waxing.

I will not comment upon the many kinds of wax now on the market, but a sure and reliable one to use is made by shredding up some pure bees wax. Melt it down, then take it away from the fire and add to the wax sufficient best American turpentine so that when mixed it will be of a thick, creamy consistency. I have always found that the wax in this condition is better applied to the panelling and doors with a good hog hair brush. Let this stand for a few hours after it has been evenly applied to allow the turpentine to evaporate. This leaves an even coating of wax upon the work.

Polishing

Then comes the polishing. I have found that this can be best done by using a good hog hair brush in the shape of a polishing black lead brush with an over handle. Brush briskly and lightly. The mouldings can be polished up easily in this way. After the brush work a good finish can be obtained with a nice soft rag. After the work has stood for some time another application of wax may be necessary. Treated in this way the work should now be in good finished condition.

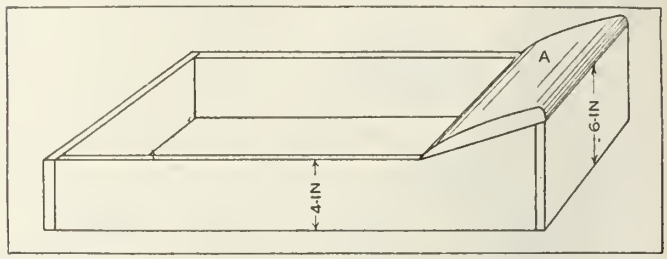
There is another way of finishing. After staining, filling, stopping in and coloring up all defective places, give two coats of a good rubbing varnish. Let stand between each coat and after the second coat let stand a week if possible. Then carefully rub down with ground pumice stone and oil or water, as the case may be, cleaning off with clean soft rags. This gives a nice finish but is not better than waxing if the latter has been properly executed. Should there be any carved work to contend with this will have a better effect if left in open grain and waxed but not filled. The color of the work is the most important thing. A job finished well upon bad coloring means just so much work wasted, so that special attention should be given to the coloring. All color or tones must be tried upon a spare piece of oak before any attempt is made to commence staining. Otherwise great difficulty will arise should a color be applied that is too dark or opaque or muddy looking. Cleanliness is a factor not to be omitted. Get conversant with your stains and a pleasing effect will be the result.

Dipping Tank for Slats

This simple but efficient method was noticed recently in a shop where a large number of blinds, slatted doors, etc., are manufactured.

The ordinary method of "priming" a blind or door slat is to hand the apprentice boy a brush and a pail of white lead and oil, and tell him to "go to it." In following instructions he generally covers himself and the surrounding scenery with a generous coating of the material, winding up by tipping the pail over and giving the floor a much-needed dressing.

In the shop above mentioned the dipping tank is much preferred to the latter method. This tank is about 4 inches deep, 10 inches wide, and as long as necessary to accommodate the longest slats. The slats are dipped in the paint and each side drawn over the felt pad, A, to clear it from all superfluous material.



This method seems to be much easier, quicker and more thorough than the old one of brushing.—The Woodworker (Indianapolis).

Some Problems in Finishing Woods

By Arthur Seymour Jennings

A question which is quite frequently put to me is, "What is the best method of darkening oak when used for fitted furniture?" In one case an addition had been made to an old house, and the oak wainscoting in a large hall was extended in the same design. The problem was to exactly match the new work with the old, and it was suggested by my correspondent that a solution of liquid ammonia might answer the purpose.

For many years darkening oak has been done by the process known as "fuming," but it possesses serious disadvantages, notably the bad surface produced for the varnish or polish that is used for the finish. Fuming is done by enclosing the oak in an air-tight box or apartment in which several vessels containing strong liquid ammonia, the fumes of which attack the acids in the wood and darken it. Obviously, the method cannot be applied to fitted furniture and the application of dilute liquid ammonia to an oak surface has often been used instead. Now, as a matter of fact, water should never be applied to the surface of any wood which is to be varnished or polished, for the reason that it will inevitably cause the grain of the wood to rise unevenly and necessitate a great deal of labor in rubbing down. The same objection applies to the use of all water stains.

The best method of darkening oak or other wood, whether fitted or not, is to use one of the oil stains now produced by most of the large paint manufacturing firms and sold under various names. These specialties possess two advantages over ordinary oil stains, which have, of course, been known for many years. The modern article is ground exceedingly fine, a manifest advantage in itself, particularly in regard to the penetration of the wood. The medium used in grinding is pure raw linseed oil and other liquids which dry hard rapidly. The colors in which these stains are made include several rich browns of varying degrees of strength, including one based on vandyke brown, which approaches black. This is the color which would probably be used in the matching of new wainscoting with the old in the question above referred to. The color is thinned down to the desired shade simply by adding genuine American turpentine.

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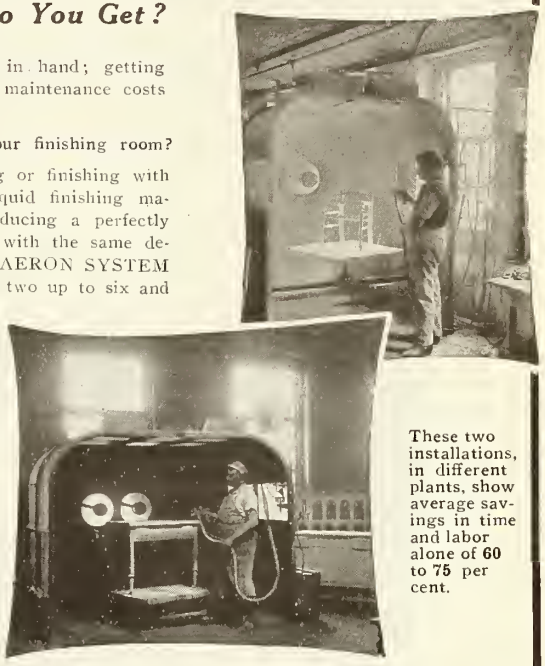

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To obtain an exact match would take some patience, and it might be necessary to mix part of a richer brown color approaching a sienna in hue with the darker one to get what was wanted, but by making tests on a piece of the same kind of wood as that used in the construction of the new wainscoting, an exact match could be made, it being always remembered that the more turpentine added to the color the lighter the tint.

The scumble colors or stains are made in many bright and rich colors, such as greens, blues, yellows, and reds, in addition to the browns, so useful for obtaining the effects of oak, etc. They have several other important uses in addition to those mentioned, and these will be presently explained.

In passing, the reader may be reminded that the words "scumble" or "scumbling" refer to the method of producing certain effects by applying any color over any other one and removing portions of the former while wet so as to expose part of the color beneath. Thus ordinary graining color is a typical example of a scumble color, because by means of graining combs, the thumb held on a piece of rag, and by other means, part of the graining color is removed, showing the ground, which is, of course, of a different color, beneath. Another example is in relief work, such as "Anaglypta," which is to be finished to produce an old ivory effect. Here the ground is a light cream and the scumble color, which is darker, is applied over it, portions of it—principally at the edges of those parts of the design which are in relief—being wiped off. Strictly speaking, however, the term "scumble stain" is a misnomer, because these colors are not stains at all in the modern acceptation of the term, which means something of the nature of a dye. They are all made from pigments which are specially selected for their permanence and capabilities of being very finely ground. Unlike some dyes, they are quite permanent, even when exposed to the strongest sunlight, and this is one of their chief virtues. The word "stain," by the way, was no doubt originally used to indicate coloring both by means of pigments as well as dyes.

The Finish of Woods to Show the Grain

Before proceeding to explain other uses of the specialties mentioned, something may be said as to the finish of hard and soft woods where it is desired to show the grain; in other words, the finish of wood where paint or enamel is not to be used. My remarks will apply equally to floors, doors and other constructional woodwork as well as to fitted furniture. It is assumed that the surface has been properly rubbed down and is in a proper condition to receive the finish.

The first thing to be done in the case of soft woods, such as pine, deal, etc., is to give a coat of turpentine mixed with gold size in the proportion of, say, ten of the former to one of the latter by measure. This coat is quite necessary, in order to prevent absorption of the varnish. Very often animal size or glue is used for this purpose, but it does not give the best results, as humid atmosphere adversely affects it and spoils the gloss of the varnish. Many complaints of varnish losing its gloss or turning "milky" could be explained by the fact that animal size was used for the undercoat.

In the case of hard woods, such as oak, mahogany, walnut, etc., a different procedure is followed. To stop absorption a wood "filler" is used to fill up the pores of the wood. Most of the large varnish houses supply excellent fillers. They are in paste form, are thinned by the addition of turpentine, and are applied by means of a stiff brush used vigorously, sufficient color being added to accord with the color of the finish. The surplus filler is immediately wiped off with wood wool, sacking or rags, leaving the pores filled in. The corners and mouldings must be picked out with a butcher's wood skewer. After twelve hours' interval the surface is rubbed down with fine sandpaper and it is then ready to receive the first coat of color.

As already intimated, this is best given by using a scumble stain or its equivalent. Pine may be rendered more acceptable in appearance if a very thin coat of light oak color is given. Mahogany, walnut and oak will each receive a coat of the color made specially for the particular wood, but in each case very little color and plenty of turpentine will be used, the object being only to improve the general tone of the wood, and in case of the oak, to darken it according to taste.

Upon a wood thus prepared one, two, or three coats of varnish may be given, according to the class of work. For fitted furniture the high gloss of a good varnish is often objected to and wax-polish or a flat varnish, i.e., one drying without gloss, is usually much preferred. A wax polished surface possesses some attractions, especially for floors, but the objection to it is that it requires a constant polishing and renovation to keep it in good condition. Labor in these days being short, wax-polished jobs are not often carried out. A similar effect is produced by using a rubbing carriage varnish in two coats, carefully rubbing down each with finely powdered pumice stone and water and polishing the last coat with rotten stone and raw linseed oil. This gives a very delicate semi-gloss finish, which is most satisfactory. If a flat finish is desired, the polishing with rottenstone will, of course, be omitted.—The Builder.

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Veneers and Panels

The Equipment of a Modern Veneer Room

Staff Article

At the plant of the Toronto Furniture Company at Toronto, they believe in being progressive. This is emphasized in the equipment of their veneer room. For the preparation of the veneer the following machines are used: Two cutters (like that shown in the illustration, Fig. 1), made by the Capital Machinery Co. of Indianapolis, Ind., and veneer jointer and Dennis taping machine supplied by the Veneer Machinery Company of Chicago. The veneer room handles large quantities of veneered work and built-up stock for furniture and phonograph cabinets.

Cold Glue

Perkins Vegetable Glue is used exclusively for all veneered and built-up work. Mr. H. Dickson, the company's superintendent, in discussing the change from animal glue to vegetable glue, gave as some of the reasons why vegetable glue is more economical: No possible danger of glue being deteriorated by heat; cauls do not have to be waxed to keep them from sticking; glue does not come through veneer, thus money is saved on the sanding operations and in the finishing; cauls are not damaged through removing glue from them, as the glue does not squeeze out; about 20 per cent. greater spread can be obtained than with animal glue; no danger of glue setting before stock is put in press; no heating of cauls required; veneer room is free from smells and more agreeable to work in.

When asked about the length of time it is necessary to leave stock in the presses, Mr. Dickson stated that they always leave theirs in over night and have never experienced difficulty with veneer coming loose.

Speaking of making the change from animal to vegetable glue, Mr. Dickson stated that scarcely fifteen minutes had been lost. The Perkins Glue Company supply the machine, charging rental for it, and it was only necessary to have his men assist with the piping and the construction of the overhead platform to hold the glue containers. (The arrangement of the containers can be seen in the illustration, Fig. 2). The old gluing machine was used until the platform and piping was in place, and then it was moved out of the way and the new machine put in its place.

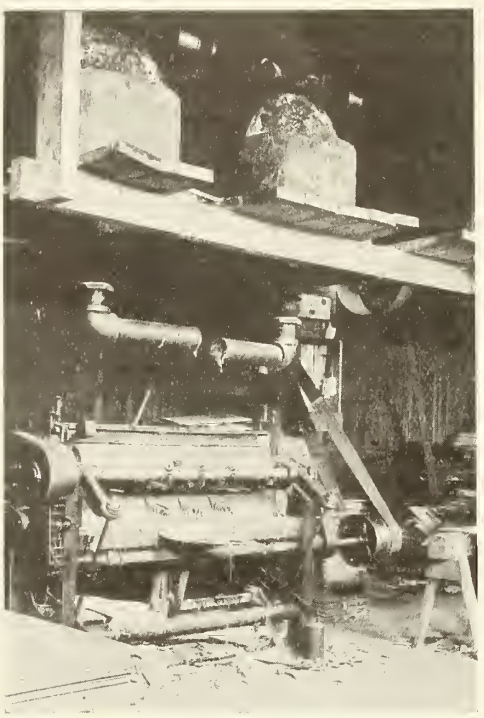

Fig. 2—The equipment for applying Perkins vegetable glue.

From this it will be seen that there is no disorganization of the veneer room in changing from animal glue. The Perkins Glue Company's expert assumes

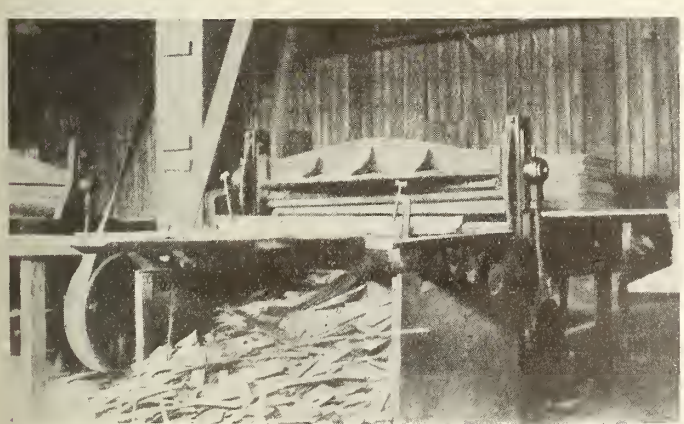

Fig. 1—A power driven veneer cutting machine. Will cut veneer 42 inches wide.

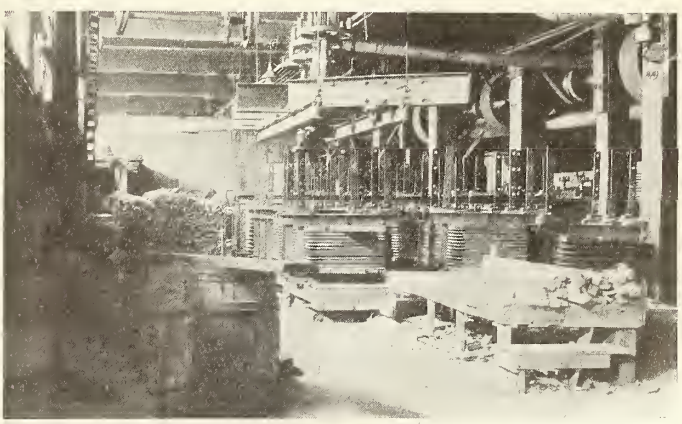

Fig. 3—Pressing equipment in veneer room at Toronto Furniture Company's plant.

charge of the operations and stays on the job until the men become accustomed to the new way. This usually requires only a few days, as the operations are not much different from veneering with animal glue. The main thing is for the men to forget all about heat. Once they get hold of this point they simply work right along in the old course.

Presses

Specially constructed hand presses are used in the Toronto Furniture Company's veneer room. These are shown in Fig. 3. The pressing apparatus is raised and lowered by means of overhead gearing manipulated from the floor by a hand wheel and chain gear. The trucks onto which the stock is piled at the gluing machine are run under the pressing mechanism, the mechanism adjusted to the height of the stock on the truck and the pressure applied. The clamping irons are then put in place and drawn up snug with wedges. After this the pressure is slacked off, and the truck shoved out of the way ready for another.

Part Glue Stresses Play in Warping

There are several pointers for the average veneer user to observe in doing fine face veneer, and especially in matching up work, says a writer in Hardwood Record. The first is that of moistening fine face veneer before using it. Some moisten it with a steam jet, others sponge it with hot water, while still others spray it. What will be best in your own case can be determined by a little practice. Generally, it is better to get some heat in the moisture, because it penetrates and is more effective in softening the wood. It is not best to have the veneer too wet. What is wanted is just enough moisture to soften it, after which it can be put between two hot cauls, or apparatus, and pressed perfectly flat, taking out all wrinkles. It can be trimmed and handled without much danger of breaking and splitting. It may seem that this would have a tendency to cause a little swelling, and thus the veneer face would be inclined to crack after it is finished. However, it is contended by old veneer men that if the moisture is used judiciously and the veneer handled right, it is much the better way to use it, and it is practically the only successful way to handle thin fine-face veneer. The other point that needs attention is that of keeping it in the clamps longer.

There seems to be a common impression that as soon as the glue sets until it holds the work it can be released, but the fact of the matter is that glued work is taken out of the clamps too soon. If it were possible to do so, it would probably be better if glued work could be kept in the clamps until every vestige of moisture had disappeared and all the strains had worn themselves out, just as we would keep a piece of bent work in the press drying, or rather clamped up in forms, for some time. Men who have studied this question contend that no good job of glue work should be released from pressure short of twenty-four hours, probably forty-eight, and even seventy-two would be better.

It is likely, by keeping stock in the clamps longer, we could get rid of a whole lot of slight warping and twisting, because the strains would have disappeared. If the veneer is kept flat in the presses it would remain that way unless strains are set up anew by coming in contact with moisture. Not only that, but the glue gets more firmly set and has better grip on the wood. Just how long glue continues to harden in setting seems to be an uncertain matter, but it is evident it is not through setting in twelve hours. It may get hard and sticky, and dry out enough, so far as we can see, that it holds firmly, but really it is not through setting until all the moisture has disappeared, and, until this happens, even the glue itself, in the process of setting, is likely to set up strains in the work. Consequently, where we have particular work, it must be given plenty of time in the press.

This thing of glue setting up strains in the process of setting brings up another point the effect that glue itself may have on a piece of work. We very seldom give consideration to this; we consider glue as a cementing material purely, and seldom calculate that while it does cementing, it may also be responsible for some of the strains. If you want to demonstrate this, try gluing a piece of veneer onto a solid plank. That is, glue veneer on one face of it. Take a plank, no matter how dry, or whether it is 1 in. thick or 2 in.; smooth off one face and glue just a thin sheet of face veneer on it, and the chances are about nine to one that it will distort the plank; it will bend it toward the glued face, and probably also cup it.

There has been much argument about glue joints on the edge of lumber shrinking, and doing this and that, but did you ever consider that glue itself probably sets up some strains in the wood? Take liquid glue and spread it on the face of a board for veneering, then apply a sheet of veneer and put it under pressure. Now this glue is a mixture of water to quite a heavy percentage, and in the process of setting the water is taken up first, you observe, by the wood; then eventually part of it evaporates into the air. Anyway, it disappears and the glue dries out. Now, if that glue is left in a solid mass to dry out, it is pretty likely that as the moisture disappears the glue will shrink in volume considerably. Being spread in a thin layer on the lumber, it may shrink slightly in thickness in drying out, but if clamped down it has no chance for what we might term general shrinkage in bulk, but it has a cohesiveness, one particle for the other, as well as an adhesiveness for the wood itself, and unquestionably it must have a mighty strong tendency to shrink together and draw itself into a smaller bulk, and it is this which sets up the strains in the wood and makes a board cup and bend when faced with a piece of thin veneer on one side and nothing on the other.

Now, then, suppose we face the board on both sides with a piece of veneer. We maintain a balance then and prevent its warping seriously, but we do not dispense with the strains that are set up in the process of gluing. We simply have one on either side, to counterbalance, and they are hard at work just the same, and just as hard as ever. Probably they eventually disappear when the glue is thoroughly set and dried out, but the fact that they are set up is one of the strong arguments in favor of keeping stock clamped up in presses until every bit of the moisture is evaporated, the glue is thoroughly set, these strains have exhausted themselves, and the work comes to a rest.

A Bit of Quick Proof

A foreman who recently took charge of a department where phonograph cabinets were made found a lot of tops of cases that were badly warped. The tops were made of ½-in. oak, with 1/16-in. oak cross-banding and faces on both sides.

He immediately started to run down the cause of the trouble. Ripping the face veneer loose from the

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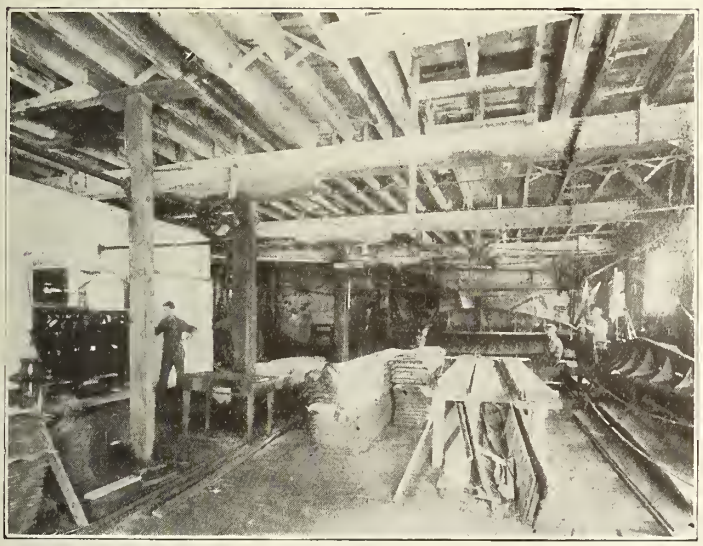

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top side, he took it and the core in a round through the different departments, enquiring how each part of the work had been done, where the veneers had been purchased, stored, etc.

Considerable time was consumed in the investigation, and not very much light thrown on the subject until he was back in his own department, where he attempted to fit the face veneer back into place and discovered that it would not reach to cover the place where it had been glued by 1/16 inch.

Of course that settled the matter. It might be a little hard to believe that a piece of 1/16-in. face veneer 10½ in. wide could pull a ½-in. core and three other thicknesses of 1/16-in. veneer ¼ in. out of true, but the fact that the face had shrunken 1/16 in. while he was carrying it around in his hand was sufficient evidence that it was a long way from being properly dried.

Immediate steps were taken for the proper drying of the face veneer, and the factory has experienced no more trouble from warped tops. Not to exceed 4 to 6 per cent. of moisture should be left in any wood that is to be used in cabinet work.—Veneers.

Table Manufacturers Meet

The Association of Dining and Extension Table Manufacturers of the United States held its annual meeting in Chicago on May 9, and discussed past activities and planned for the future. The association keeps tab on manufacturing and sales to enable it to tell at any time the condition of business. This record has been kept during the past five months, and it has shown a constant increase in business. The membership is now larger than ever before, and several new members were added during the recent meeting.

The work of the audit bureau, which looks after collections, was found highly satisfactory. More than a million and a half dollars of delinquent accounts have been collected by the bureau.

It was considered probable that an advance in price of about 15 per cent. in tables will be necessary soon to meet the greater cost of production.

Substitute for Boxwood

The United States Forest Products Laboratory at Madison, Wis., is investigating the supply of woods that may be substituted for Turkish boxwood, which is so scarce that it can no longer meet demands, and the price has advanced to such a degree that many former users cannot buy it. It is used chiefly in this country for wood engravers' blocks, draftsmen's scales, chessmen, roller skate wheels, small handles, and certain kinds of turnery and novelties. It was once the almost exclusive wood for shuttles, but high price shut it out nearly thirty years ago, and its place was taken by persimmon and dogwood.

The man who would succeed must be progressive, keeping awake to the movement of the times, adapting himself to the current and swimming with it. It is difficult to make progress when attempting to breast the rapid stream.

Concentration of ideas upon your business is necessary to success.

AT YOUR SERVICE

We have just received one of the largest consignments of veneers ever shipped into Canada at one time. It includes many choice stocks in MAHOGANY, AMERICAN WALNUT; also over one million feet of choice QUARTERED OAK, GUM and POPLAR. These veneers are now in our warerooms, and are open for inspection.

If convenient, come in and choose your own figures. If not, we can assure you your mail, wire, or 'phone order will receive that same careful attention that always characterizes our service. Prices are unusually attractive.

TORONTO VENEER COMPANY

TORONTO 93-99 Spadina Avenue **ONTARIO**

OAK MAHOGANY CIRCASSIAN MAPLE

VENEERS

BIRCH POPLAR CHERRY WALNUT GUM

Wood - Mosaic Co.
NEW ALBANY, - - IND.

WALNUT
Lumber — Dimensions — Veneers

If you are in the market for anything in Walnut, let us figure with you. We have cut three million feet of Walnut in the last year, and have a good stock of all thicknesses dry. We can also furnish Walnut dimension—**Walnut Veneers.** We have a large stock of veneers, plain, stripe figured and stump wood.

Wood-Mosaic Co., Inc.
NEW ALBANY, - - IND.

K QUALITY

TEAK

K QUALITY

Write for prices on all
Plain and Fancy Lumbers and Veneers
Mahogany, Oak, Birch, Walnut, Ash, Poplar, etc., rotary, sliced or sawed in all thicknesses

Your Patronage Respectfully Solicited

Prompt attention given to all enquiries, and SAMPLES SENT IMMEDIATELY ON REQUEST, or representative will call.

George Kersley
224 St. James Street, Montreal

K QUALITY

MAHOGANY

K QUALITY

American Walnut Veneers

A larger and better assortment of AMERICAN WALNUT VENEERS in Sliced, Half Round and Stump Wood than ever before offered.

Roberts Veneer Co., New Albany, Ind.

OAK MAHOGANY CIRCASSIAN MAPLE

VENEERS

BIRCH POPLAR CHERRY WALNUT GUM

Mahogany Figured Red Gum
American Walnut Curly Birch
Quartered White Oak
(Sawn or Slice Cut)
And all other kinds of

Domestic Veneer
AND
Thin Lumber

ACME VENEER & LUMBER CO.
8th, Harriet and 7th Streets - - - - CINCINNATI, Ohio

We can ship
IMMEDIATELY

2 cars of 1/20 in. Unsel. Gum Veneer.
4 cars of 1/4 in. Unsel. Gum Veneer.
3 cars of 1/8 in. Unsel. Birch Veneer.
2 cars of 1/16 and 1/8 in. Red Oak Veneer.
15 cars of Panels, 3/16 to 1/2 in., in various woods.

GEO. L. WAETJEN & CO.
MILWAUKEE - - - WISCONSIN

EMPIRE VENEER COMPANY, Inc.
Manufacturers of
Mahogany
American Walnut
Quartered Oak
and Other Fancy Cabinet Woods
Office and Show Rooms, 14 E. Jackson Blvd.
Chicago
JOHN D. LASKY, President
Write us for samples

Veneers and Panels
PANELS
Stock Sizes for Immediate Shipment
All Woods All Thicknesses 3 and 5 Ply
or made to your specifications
VENEERS
5 Million feet for Immediate Shipment
Any Kind of Wood Any Thickness
J. J. NARTZIK
1966-76 Maud Ave., - - CHICAGO, ILL.

BUYERS OF VENEERS AND PANELS
will find it to their advantage to purchase from the manufacturers and dealers whose advertisements appear in this publication. They are progressive firms—the leaders in the business, which is a guarantee of good service and prompt attention to orders.

Give your business to the man who will spend his time and money to get in touch with you. He deserves it—if his stock and prices are right.

OAK MAHOGANY CIRCASSIAN MAPLE

VENEERS

BIRCH POPLAR CHERRY WALNUT GUM

AT GRAND RAPIDS

READY TO SHIP

Poplar Crossbanding
Gum Veneers
Plain Oak
Quartered Oak
Mahogany

Immense Stocks — Right Prices
Write us

WALTER CLARK VENEER CO.
Grand Rapids

Indiana White Oak Lumber and Veneers

Band sawed from the best growth of timber.
We use only the best quality of Indiana White Oak.
From four to five million feet always on hand.

Walnut Lumber
Our stock assures you good service.

Chas. H. Barnaby, Greencastle, Indiana

The Glue Book

WHAT IT CONTAINS

Chapter 1—Historical Notes
Chapter 2—Manufacture of Glue
Chapter 3—Testing and Grading
Chapter 4—Methods in the Glue Room
Chapter 5—Glue Room Equipment
Chapter 6—Selection of Glue

PRICE 50 CENTS

Woodworker Publishing Co. Limited

345 Adelaide St. West, Toronto

The Lumber Market

Domestic Woods

Hardwood conditions remain much as they have been for some time. Wholesale lumbermen report that the demand from the various woodworking industries continues good, but that prices have not advanced materially. The difficulty in making shipments has not been so acute during the last few weeks, although cars are not plentiful by any means.

All things considered, there is a very large volume of trade in progress to-day and everything that is being sold is bringing high prices, but one does not hear many complaints from the manufacturers who are paying the prices. They are taking the situation philosophically, having no doubt by this time become accustomed to paying high prices. Wholesale lumbermen and manufacturers of white pine report that they never have had such extensive enquiries and orders for white pine as they are receiving to-day from United States points. The activity across the line is to some extent a result arising out of the demand for war purposes. As the building trade in Canada is not particularly brisk this feature does not work any particular hardship on Canadian consumers of white pine; these consumers being mostly engaged in the manufacture of sash and doors and interior trim for buildings.

The demand for British Columbia woods, particularly Douglas fir, in eastern Canada, is exceptionally strong, but the situation is somewhat unsatisfactory as the B. C. mills are tied right up with orders and are not anxious to book any further business in eastern Canada at present. The result of this is that prices are high. The price of Douglas fir was increased $2 a thousand about a week or so ago.

Prices on the leading woods at Toronto for car lots are as follows:—White ash, firsts and seconds, 1½ and 2 in., $67; birch, firsts and seconds, inch, $50; basswood, firsts and seconds, inch, $50; soft elm, firsts and seconds, inch, $45; rock elm, firsts and seconds, 1½ and 2 inch,, $55; soft maple, firsts and seconds, inch, $40; hard maple, firsts and seconds, inch, $43; Douglas fir, No. 1 and 2, 1 inch, clear, $50.75.

Imported Woods

The hardwood market in the United States remains much as it has been except that there have been some light advances on some of the southern woods. There has been a suggestion that some of the big hardwood firms around Memphis, Tenn., have been securing large orders from the United States Government for shipbuilding and other purposes. No definite information has been given out, but there is an unusually active demand. This demand has, of course, been reflected in the price list.

There has been an increase in the demand for hardwoods and thick stocks from the firms manufacturing vehicles for war purposes. Oak and hickory for wheel rims and black walnut for gunstocks are in great demand. Stocks of northern hardwoods are broken and it is becoming harder and harder to obtain dry stock. At the southern and eastern mills the stocks of quartered red and quartered white oak have increased from 15 to 33 per cent., but other grades of oak showed decreases, in some cases as much as 50 per cent. The stocks of cottonwood and quartered chestnut are very low, while stocks of chestnut, quartered poplar and poplar showed some increases. The prices on these items have not changed materially. Gum continues to be in excellent demand and the prices are accordingly firm.

Transportation is the big problem in the lumber business in the United States. The car shortage is affecting the logging districts as well as the shipments from the mills. Logging conditions are reported to be almost ideal, but the shortage of cars has seriously hindered the getting of logs to the mills.

Reports indicate that the sash and door factories in the United States are not in the market for such large quantities of hardwoods as they have been for some months past. The entry of the country into the war has no doubt affected the building trade. This lack of demand, however, is more than made up for by the wagon factories and vehicle trade. An idea as to the strength of prevailing prices may be gained from the following quotations, which are fairly representative of the prices asked by the mills:—Birch—4/4, firsts and seconds, $54; No. 1 common, $39; No. 2 common, $29; No. 3 common, $21; 5/4, firsts and seconds, $57; No. 1 common, $47; No. 2 common, $37; No. 3 common, $51; 6/4, firsts and seconds, $61; No. 1 common, $51; 8/4, firsts and seconds, $66; No. 1 common, $56. Basswood—4/4, firsts and seconds, $52.50; No. 1 common, $42.50; No. 2 common, $32.50; No. 3 common, $26.50; 5/4, firsts and seconds, $54.50; No. 1 common, $44.50; No. 2 common, $34.50, and No. 3, $28.50. Maple—4/4, firsts and seconds, $51; No. 1 common, $41; No. 2 common, $36; No. 3 common, $19; 6/4, firsts and seconds, $61; No. 1 common, $51; No. 2 common,$41, and No. 3 common, $20; 8/4, firsts and seconds, $66; No. 1 common, $56; No. 2 common, $46; No. 3 common, $22. Prices on southern hardwoods, especially red and sap gum and cottonwood, are also very strong. With the southern hardwoods oak shows higher prices than within recent weeks, and this wood is said to be in added demand by war orders. There is also a good demand for southern elm, ash and hickory, traceable to some degree to war business, as the demand comes from the vehicle trade. Both hardwood veneers and flooring are strong in price and demand.

Waterproof Leather Belt Cement

A correspondent says celluloid dissolved in acetone makes one of the best waterproof leather belt cements. The mixture should be of about the same consistency as syrup. Apply first coat to the laps and let dry for half an hour, then apply second coat and put laps together, keeping under heavy pressure of weights or in clamps for six hours or more. Trim off the surplus celluloid and the belt is ready to run. This cement, says our correspondent, is just the right thing for filers and planing mill men to use on "wet" planer knife grinders and saw grinders. Acetone evaporates very quickly. Keep the cement in a clean, air-tight container, and away from fire, religiously; it is inflammable. Before using, be sure that the leather is clean, dry, and free from grease. Roughen the laps well. After the acetone evaporates, the leather will be bound together by a strong, flexible celluloid film that runs well over small pulleys.—"The Woodworker" (Indianapolis).

S. B. ANDERSON, PRESIDENT
C. J. TULLY, VICE-PREST.
B. C. TULLY, SECRETARY
H. B. ANDERSON, TREASURER

BUILT UP GUM VENEERS

ANDERSON-TULLY COMPANY

MANUFACTURERS OF

HARDWOOD LUMBER-VENEERS.

PACKING BOXES - EGG CASES.

MEMPHIS, TENN. U.S.A.

MILLS:
MEMPHIS, TENN.
VICKSBURG, MISS.
RAYVILLE, LA.
MADISON, ARK.

Cable Address
VENEERS

May 15, 1917.

Mr. Buyer of
Southern Hardwoods and Veneers,
Everywhere.

Dear Sir:

While this is not exactly a Confession, we will have to admit that we have not been able to serve our friends this past year as we would like to, or as we have been in the habit of doing during normal conditions. The unprecedented demand for southern hardwoods together with the car shortage have placed us, as well as every other lumber manufacturer, in an embarrassing position at times, for our stocks have been more or less broken.

But - and here is the silver lining - in spite of the conditions which the whole industry has been forced to meet, it is fortunate for you that our facilities are such - comprising as they do five large sawmills, and a veneer plant cutting gum core stock and crossbanding - that we are still able to cater to both your immediate and future wants.

Wouldn't it be good business to link your organization to ours? Tie your factory to a base of supplies that is practically complete?

Send for our stock list of both green and dry hardwoods, then let us quote on your requirements. It would be to your advantage to anticipate as far ahead as possible so as to insure you the delivery you wish.

Yours until the last car is shipped,

ANDERSON-TULLY COMPANY,

SAT-B.

P. S: "ATCO" stands for exceptional service - the desire and ability to furnish you with the If-I-Were-You kind - GOLDEN RULE QUALITY.

Compensation Act

The report of the Workmen's Compensation Board of Ontario for the year 1916 contains much that is of interest to those who are engaged in the woodworking industry. "The two years' experience now had of the Act," the report says, "affords fair opportunity to judge of its merits. From the tenor of communications from both employers and workmen few would care to revert to the old system. The furnishing of compensation without expense to the workmen and at actual cost to the employer, the speedy disposition of cases, removal of causes of friction between employer and workmen, immunity from litigation, and making compensation for injury the rule rather than the exception, are the outstanding advantages of the present system. As under any law, there will be individual instances where the new condition may be less favorable to either party than the old, but the general advantage to both workmen and employers and to the community at large seems to be unquestioned.

The report includes a statement of income and expenditure for Schedule 1, which includes furniture manufacturing and planing mills. The total receipts in the furniture manufacturing industry were $50,489, expenditure $46,974, provisional balance $3,515; planing mills income $85,097, expenditure $111,248, showing a provisional deficit of $26,151.

The administration cost borne by the employers of all the industries in Schedule 1 is 4.21 per cent. of all assessments collected during the year. The total expenditure for administration amounted to $112,523. The amount apportioned among employers in Schedule 1 was $74,527, being in proportion to the number of accidents, as compared with those in Schedule 2; some of the administration cost also being borne by the province.

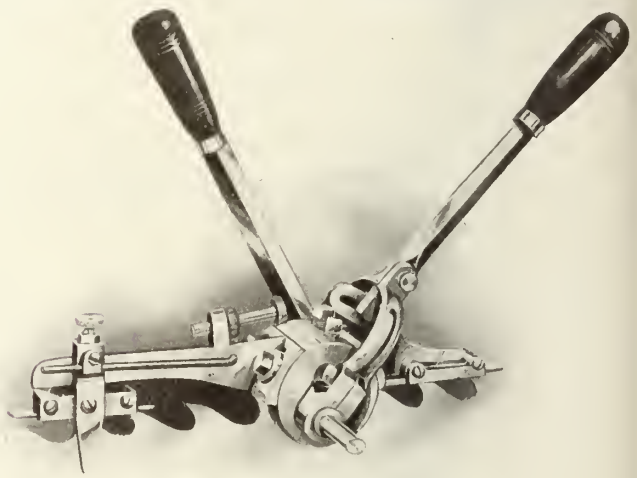
Accident statistics for 1916 in connection with the two classes referred to above are as follows:

Furniture mfg. etc.	170	83	2	255
Planing mills, etc.	353	107	3	463

In connection with the causes of accidents, it is shown by the statistics presented that the most prolific cause is what is classed as "saws and kick-backs therefrom." From this cause 642 accidents were reported, 442 of which resulted in temporary disability; 195 in permanent disability, and 4 in death. "Shapers, stickers, matchers and headers" were responsible for 98 accidents, which included 67 cases of temporary disability and 31 of permanent disability. "Planers, veneerers and sanders" were responsible for 107 accidents, including 82 which resulted in temporary disability and 25 in permanent disability. "Jointers and edgers" produced 95 accidents, of which 51 caused temporary disability and 44 caused permanent disability.

The American Oval Die Swage

The Machinery Company of America, Grand Rapids, Mich., who are the distributors of the American Oval Die Swage which was placed on the market about two years ago, report a brisk and increasing demand for it. They state that they are receiving enthusiastic letters from users in the south, on the Pacific coast, and in Canada, all testifying to the efficiency of the swage and to its economy of upkeep. The American Oval Die Swage carries an oval die with four wearing surfaces the entire length, giving it, the company claim, from 200 to 1,200 per cent. more wear and longer life than that of any other swage die. The die is supported its entire length by means of two eccentric bushings which entirely close up the opening in the swage head, and eliminate any possibility of cuttings of steel from the teeth getting in and cutting out the bearings. The eccentric bushings operate in hardened steel bearings so that when the bearings become worn it is unnecessary to purchase a new head at a considerable expense, but a well-fitting bearing can be obtained by merely replacing the steel bushings at a very slight cost after which the head is practically as good as new. The openings through the eccentric bushings are slightly



The American oval die swage.

off centre, so that by turning the bushings over, the same results are realized as by having two dies of different eccentrics. Also, dies of different sizes and eccentrics may be employed in the one swage by simply using eccentric bushings to fit, which the company claim to be most valuable and necessary for satisfactory operation. The swage is easily and quickly adjusted and assembled. By removing one nut the die lever, bushings and dies can be immediately removed. For the special benefit of those who are not familiar with the adjustment of the swage, the position of the anvil on the tooth can be readily seen.

The features embodied in this swage make it most efficient, durable and economical to operate and are rapidly creating an increased demand for it.

The Machinery Company of America will gladly mail, upon request, to anyone who is interested, further information and a catalogue of their complete line.

Light Ply-wood Boats

One of the new ideas going the rounds is that of making canoes and other light water craft with built-up veneer, which makes it practical to construct a craft very light in weight, with a maximum of strength. This is a splendid place to test out the waterproof glue offerings, and with these properly tested out there should be opened, in the work of canoe-building, a big field of future use for plain veneer and ply-wood made up into special shapes for this work. We know from experience in the use of ply-wood for panels and other cabinet work that it is the built-up wood which will give the maximum of strength with the minimum of weight. A good thin ply-wood or veneer canoe would be almost as light as one made of canvass and much stronger and more serviceable generally.—Veneers.

E. H. Shreiner Lumber Company

EXCLUSIVELY WHOLESALE

Band Mill—West Salisbury, Pa.

General Offices—PITTSBURGH, Pa.

8 cars 4/4 No. 2 B. Poplar

SPECIAL

Watch this space each month for Specials.

WALLACE

Bench-Planer

The old-fashioned "Jack Plane" has given place to this time and labor-saving, motor-driven Wallace Bench-Planer. All the hard work has been eliminated, and you get uniform, mechanically correct results, automatically.

Portable---Safe

Wallace Bench-Planer weighs only 50 pounds, and runs by electric power from regular light socket. Eighteen inches long, four-inch knives.

Send for literature and prices.

J. D. Wallace & Co.

1402 W. Jackson Blvd.

CHICAGO Ill.

This machine may be purchased from any Canadian machinery dealer.

The Union Box Company

Wooden Box Manufacturers

BALTIMORE, Md., U.S.A.,

Have For Sale

One No. 288 Linderman Jointer

in first-class condition, with extra sets of knives, etc., capable of taking eight foot material.

Also have **three 4-Hole Boring Machines,** such as used for boring holes in diaphragms for AMMUNITION BOXES.

Make us an offer for these machines, or write for further particulars.

Hardwoods

offered for

Prompt Shipment

28 M 1 x 9 and up No. 3 Com. Birch.

38 M 1 x 4 and up No. 3 Com. and Btr. Birch.

1 car 6/4 in. No. 1 Com. and Btr. Birch and Maple (largely Birch).

3 cars 4/4 in. No. 2 Com. and Btr. Black Ash.

3,500 ft. 6/4 in. No. 1 Com. and Btr. Black Ash.

8,000 ft. 8/4 in. No. 2 Com. and Btr. Red Oak.

12,000 ft. 4/4 in. No. 2 Com. and Btr. Red Oak.

3 cars 4/4 in. No. 3 Com. Hard Maple.

1 car 4/4 in. No. 3 Com. and Btr. Hard Maple (winter cut).

2 cars 5/4 in. No. 2 Com. and Btr. Hard Maple (winter cut).

4 cars 6/4 in. No. 2 Com. and Btr. Hard Maple (winter cut).

We Shall Be Glad to Serve You

Graves, Bigwood & Co.

Manufacturers

of

PINE
HEMLOCK
HARDWOOD } **LUMBER**

712 Traders Bank Building

TORONTO - ONT.

Mills at—Byng Inlet, Ont.

and

Deer Lake, Ont.

Trying to Increase Freight Rates

The Freight Committee of the Furniture Manufacturers' Association recently gave the manufacturers a full report of their work and the evidence they presented to the Railway Commission of Canada in reference to new freight rates which the railway companies are endeavoring to bring in. The report was as follows:

"The proposed classification, No. 17, covering freight on all Canadian roads, which is now before the Railway Commission of Canada, proposes some very radical changes in classification which are of interest to every furniture manufacturer in Canada. The matter is one that should be taken up by all the manufacturers, so that pressure will be brought to bear to prevent this classification coming into force as it is. In fact, no changes should be made in the old classification without a consultation with the interested manufacturers.

"In order that you will be able to see the far-reaching effect of the proposed changes, we present herewith a comparison of the present rates and the proposed new ones. As an instance of the possibilities of increased freight rates under the proposed new classification we cite the following:

"An ordinary mixed car load of furniture would probably contain extension tables, china cabinets, buffets, dinner wagons, chairs, bedsteads, bureaus, dressing-tables, chiffoniers, being what is classed as complete or matched suites for the dining-room and bedroom. Such a car would probably also contain living-room or parlor furniture, such as upholstered settees, chairs, bookcases, etc.

"Taking such a car, say, to Winnipeg, under present classification, it would be billed as 14,000 pounds, at fourth-class rate, which is to Winnipeg from Kitchener 83c per hundredweight, making the charge $116.20. Under the proposed classification No. 17 the minimum weight allowed would be 20,000 pounds, and the rate would be second class, which to Winnipeg from Kitchener is $1.35, and the freight on this car would be $270. Thus an increase in freight charges of almost 150 per cent. would result. Changes in classifications affecting bar-room, store, and office furniture indicate an advance of 50 per cent. in L.C.L. (less than car lots) freight charges.

"At a sitting of the Railway Commission in the city of Toronto these facts were presented to the Railway Commission by your committee. Mr. Shaw, of the Canada Furniture Manufacturers' Association, of Woodstock, Ont., was also present at this hearing, and presented the case to the commission. It was then ordered that the commission hear objections to the new classifications at Ottawa and Montreal. The commission expressed themselves as desirous of the railways and manufacturers getting together informally, and in the meantime the railways are to show cause why the new classification should go into effect."

Commercial Intelligence Service

Following is an abstract from the annual review of the Canadian Commercial Intelligence Service as issued recently by the Department of Trade and Commerce at Ottawa:

Wood, Lumber and Manufactures Of

The lumber trade generally and South African Railways Stores Department, were followed up closely during the year as well as all users of box shooks. As a result of these efforts, several demands for cargoes of lumber were submitted to Canada, also a repeat order of special car building Douglas fir for the South African railways. On box shooks, several sample orders, running into 10,000 boxes each, have been placed with Canadian firms, who submitted complete details and prices; other firms quoted much higher than the Baltic prices. With any kind of normal ocean shipping from British Columbia and at prices close to present quotations, big shipments will surely be booked. Limited ocean freight space has prevented a larger export of deals and other lumber from eastern Canada.

Prepared boards from Canada are finding more favor each day and some big business was booked during the year, although the building trade in all centres of South Africa is much smaller than usual. In handles several companies are now represented and many new orders have been placed with Canada. The maple pick, axe and tool handle is making some headway. In broom handles new trade has come to Canada, some ten days ago an order was cabled to one shipper for 60,000 broom handles. Cart and carriage material in wood from Canada has profited in a big way by direct representation. The class of goods shipped have turned out well, which has resulted in many repeat orders.

Furniture

Canada's position on chairs and some bedroom furniture improved during the year. The Canadian chairs, with the exception of a small percentage shipped in faulty parts have a splendid reputation and are now better known than at any time in the past. There is a big demand for any furniture shipped in the k.d.s., and a much bigger trade would be secured if Canadian manufacturers were represented instead of depending on foreign indent houses, who often secure similar goods from their home market, claiming they could not be supplied by the Canadian manufacturers, and this is not always right, as at the time some Canadian manufacturers were inquiring how best to secure new or more South African trade.

Tables, chairs and bedroom suites have been ordered from new sources of supply in Canada for the first time in 1916. Through information imparted, owing to intelligent up-to-date information on our files from some Canadian concerns, several orders were placed during the year.

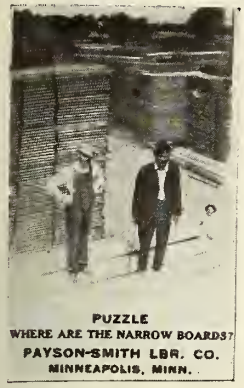
Representation by active interested agents would bring good business in all these lines.

Musical Instruments

Canadian manufacturers of pianos and organs have made good progress during the year as a number of them are now represented; business with Canada has been more general, but orders are not as bulky as they will be owing to the extreme cost of ocean freights.

This office covered the situation fully in reports to manufacturers and illustrations showing the kind of instrument required. Quite a bit of the new business for Canadian firms in these lines originated from this office, due to the fact that inquirers were shown the new catalogues and price lists with discounts before the agencies had been arranged.

Don't have to look for everything you want. Make yourself acquainted with the whereabouts of everything.



Dry Hardwoods

4 cars 3/4 No. 1 Com. and Bet. Plain Red Oak.
5 cars 3/4 No. 1 and 2 Common Plain Red Oak.
10 cars 4/4 No. 1 Common Plain Red Oak.
5 cars 4/4 No. 2 Common Plain Red Oak.
5 cars 4/4 F.A.S. Plain White Oak.
5 cars 4/4 No. 1 Common Plain White Oak.
5 cars 4/4 No. 2 Common Plain White Oak.
5 cars 6/4 No. 1 Com. and Bt. Plain White Oak.
5 cars 8/4 No. 1 Com. and Bt. Plain White Oak.
3 cars 8/4 No. 2 Common Plain White Oak.
2 cars 4/4 F.A.S. Quartered White Oak.
2 cars 4/4 No. 1 Common White Oak.
6 cars 6/4 F.A.S. White Oak.

We also have a fine stock of Northern Hard Maple, Birch, Basswood, etc.

Payson Smith Lumber Co.

Chicago Office: 1665 Old Colony Bldg. J. C. Moffat, Rep.

Minneapolis, Minn.

Detroit Office: Henry Clay Hotel P. M. Youngblood, Rep.

DIMENSION STOCK

Will save you money, increase your capacity and make higher grade Furniture, because it is clear

2 cars 3x3 8 ft. clear Sap Gum.
2 cars 2x2 8ft. clear Sap Gum.
1 car 2x2 48 in. clear Oak Squares.
5 cars 2x2 30 in. clear Sap Squares.
1 car 2½x2½ 30 in. clear Sap Squares.
1 car 2x2 30 in. clear Red Gum.
3 cars 2x2 30 in. clear Oak Squares.
1 car 2x2 30 in. clear Ash Squares.
2½x2½ 30 in. clear Ash Squares.

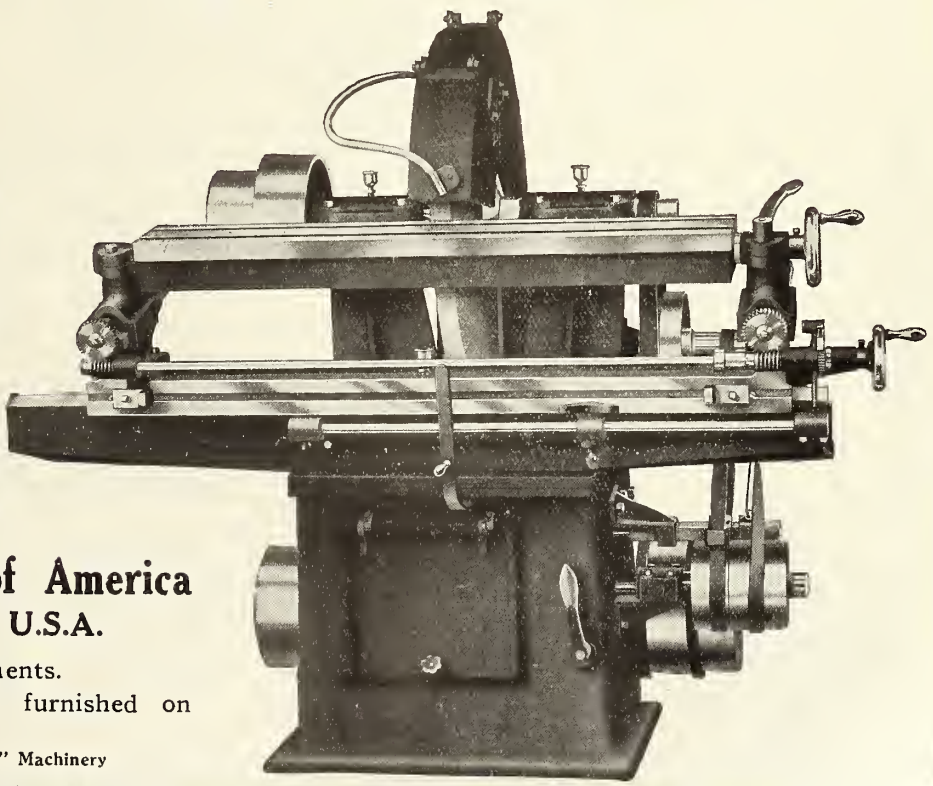
Write us when in the market for all kinds of HARDWOODS, cut to your sizes.

The Probst Lumber Co.

Cincinnati, Ohio

Saw and Knife Fitting Machinery and Tools

Saw Anvils
Brazing Clamps
Brazing Compound
Filers
Filing Clamps
Forges
Gummers
Hammers
Lap Cutters
Lap Grinders
Leveling Blocks
Pulleys
Retoothers
Setters
Shapers
Sharpeners
Solder
Straight Edges
Stretchers
Swages
Tension Gauges
Tools
Bandwheel, Cutter and Tool Grinders
Knife Grinders and Balances



Machinery Company of America

Grand Rapids, Mich., U.S.A.

Describe Your Requirements.
Catalog with special information furnished on request.
"Covell" — "Hanchet" — "B T & B" Machinery

News of the Trade

The Dominion Government expect to have their artificial limb factory at North Toronto, ready in about three weeks.

Beaverton, Ont., is to have a toy factory, the Beaverton Toy Company having been incorporated recently with capital of $40,000.

The Kerr Wood Turning Company will conduct a wood turning business at Toronto, Ont. They will operate on a capital of $40,000.

The Neustadt Furniture Company, Limited, Neustadt, Ont., has changed its name to the Moore Manufe Company of Canada Limited.

The J. & J. Kerr Company, of Petrolia, Ont., recently received an order from the Imperial Munitions Board for 15,000 shell boxes.

The Imperial Munitions Board recently called for tenders for 500,000 two-round 4.5 shell boxes, and orders were placed during the last week in May.

The Raymond Timber Company, Limited, recently incorporated in British Columbia, will manufacture sash and doors, boxes, siding, lath and shingles.

Stanley Wilkinson, of Leamington, Ont., is contemplating the erection of a plant to manufacture refrigerators. The plant will likely be operated by electric power.

A recent report states that the London & Petrolia Barrel Company, of London, Ont., are preparing plans for a dry kiln. Mr. Forrestal is the manager of the company.

The Gray-Dort Motors Limited, of Chatham, Ont., are installing four dry kilns at their plant. The company state that these dry kilns are to be constructed from their own blue prints.

F. C. Burroughs, who was head of the F. C. Burroughs Furniture Company, of Toronto, died recently after an illness of only a few days. Mr. Burroughs was known to furniture manufacturers throughout Canada.

The by-law which was submitted to the ratepayers of Elmira, Ont., authorizing a loan of $15,000 to the Machinery and Transmission Company, was carried by the necessary two-thirds majority. The company will erect a large addition to its plant.

The Phonola Company of Canada, Elmira, Ont., has purchased the phonola business from the Pollock Manufacturing Company, of Kitchener, Ont., and will manufacture the phonolas in Elmira, in the building formerly occupied by the Interior Woodwork Company.

At a recent meeting of the Toronto Board of Education a communication was read from Mr. L. B. Beale, of the British Columbia Forest Branch, offering to present a car of B. C. lumber for use in the woodworking classes of the Toronto Technical School. The offer was accepted with alacrity.

The planing mill and box factory of the Cameron Lumber Company, Victoria, B.C., was recently damaged to the extent of $100,000 by fire. At this writing we are not able to state whether the company will rebuild, but in all likelihood they will, as the lumber and box business in British Columbia is particularly good at this time.

The planing mill belonging to the Canada Pine Company at Huntsville, Ont., has been destroyed by fire. Some boys playing with matches set fire to a pile of shavings and started the conflagration. Owing to the direction in which the wind was blowing the sawmill and main buildings were saved. The loss, however, is heavy, and is partly covered by insurance.

The Builders' Moulding Company, Limited, has been incorporated with capital of $40,000 to manufacture interior woodwork and fittings, flooring, mouldings, sash and doors, etc. The provisional directors are T. E. McMurray, W. C. Gardiner and F. Roseberry. The company's factory and office are located on Noble Street, Toronto.

The death occurred recently of Mr. A. R. Williams, president of the A. R. Williams Machinery Company. Mr. Williams was in his 79th year and had been in failing health for some time. He was well known in industrial circles in Canada and was a member of the Canadian Manufacturers' Association and of the Toronto Board of Trade.

Mr. L. B. Beale, the British Columbia Lumber Commissioner, at Toronto, was summoned to Victoria, B.C., a short time ago, to conduct some investigations into the utilizing of the waste from the sawmills and box making plants. As Mr. Beale is a practical man he will no doubt be able to find a solution to the problem—in part at least.

The plant of the Fraserville Chair Company at Riviere-du-Loup, P.Q., was seriously damaged by fire on May 31. The damage is estimated at $40,000. The insurance is $22,000. The company advise us that it is the intention of the board of directors to rebuild. A meeting of the shareholders is to be called so that the matter may be placed before them for final decision.

Senator N. Curry and W. W. Butler, president and vice-president respectively of the Canadian Car and Foundry Company, of Montreal, were in Ottawa recently discussing with the Government a contract for cars which will involve an expenditure of $13,000,000. The proposed contract calls for 5,000 cars at a price of $2,600 each. It is understood that the company will undertake to deliver the entire order by the end of March next. In case the negotiations are successful the shops at Fort William will be opened up for the first time. The cars will be used on the Government railways as well as leased to other lines which have use for them.

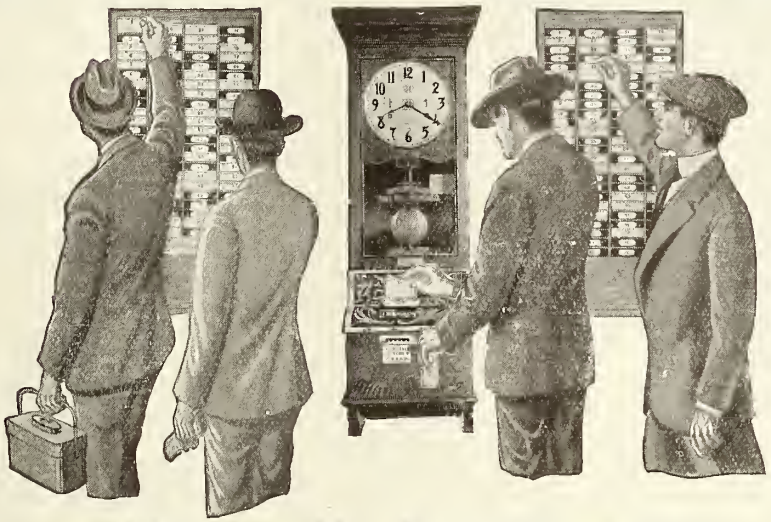
The Liberty Loan

Baxter D. Whitney & Son, Winchendon, Mass., the woodworking machinery manufacturers, had a successful Liberty Loan campaign in their factory, and have reason to feel well satisfied with the results. Seventy-five per cent. of the employees of this company subscribed $25,300 for the purchase of Liberty Bonds, making an average of over $100 per man. The Bonds were sold on the installment plan by means of small weekly payments. Many of the subscribers are men who are eligible for military service, and a few have already enlisted and have asked the privilege of paying for the Bonds from the money they will receive from the government.

Dodge Manufacturing Company Appoints Service Man

The Dodge Manufacturing Company have appointed their Mr. Burrows, who is a practical millwright and experienced power transmission engineer, to be at the service of customers for the purpose of giving advice and information. Mr. Burrows is available for calls in Toronto for all matters pertaining to belt drives, alignment, proper installation and running of machinery, etc. Customers desiring his services are requested to telephone Adelaide 4285 or Junction 3200.

The First Line of Defence



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FOR SALE

Gliding Casters—"evergrip," about six hundred sets, mostly 5/8 in.; some 1/2 in., 3/4 in. and 7/8 in. Low price for quick sale. Box 25, Canadian Woodworker, 345 Adelaide St. W., Toronto. 5-6

Lumber For Sale

100,000 ft. 1 x 4 and up No. 1 Hemlock.
200,000 ft. 1 x 4 and up No. 2 White Pine Mill Cull.
100,000 ft. 1 x 10/12 in. No. 1 White Pine Mill Cull.
100,000 ft. 1 x 12/16 ft. Com. and Drsg. White Pine.
150,000 ft. 2 x 8, 10/12 No. 2 White Pine Mill Cull.
3 cars 7/8 x 3 in. Crating.
100,000 ft. 1 x 7 and up White Pine Culls.
100,000 ft. 1 x 10/12 in., 6/11 ft. No. 3 Com. White Pine.

The Elgie & Jarvis Lumber Co. Limited

18 Toronto St., TORONTO, ONT.

France Desires to Build Her Own Dwellings

The annual review of the work of the Canadian Commercial Intelligence Service has recently been issued. The report contains a few matters of interest to woodworkers. In regard to the portable house industry and trade it states that six models of portable houses were sent to Paris about midsummer of last year and were set up in the Tuilleries Gardens, a short time after the opening of the Reconstruction Exhibition held there. Mr. Frank Pauze, of Montreal, a member of the Canadian Trade Commission which visited France, also had interviews with the lumber trade and furnished valuable information to several builders who made enquiries regarding portable houses. The six model houses were presented to the "Secours National," and are being utilized by the Canadian General Hospital No. 8, at St. Cloud.

It was ascertained, the report says, that the policy adopted by the French authorities would be that the construction of houses for the devastated regions should be undertaken as much as possible in France.

At the beginning of 1916 quotation lists of several lots of lumber were sent to France by an Ottawa firm, and one or two shipments were made with satisfactory results, but the increase in ocean freight rates prevented further business.

Great Demand for Aeroplane Spruce

The enormous extent of the European aviation operations in the war on the west front alone is shown by the big contracts being filled on the Pacific Coast generally for spruce for aeroplane stock. The British Government recently placed a contract for twelve million feet of spruce lumber for aeroplane stock and for knock down houses, to be delivered in one year. And this is only a part of the work being done for the aviation corps. Several mills are turning out spruce flitches of clear stock for this work, a single carload of which would apparently make enough aeroplanes to supply an army, but instead these shipments are going forward in whole shiploads. In this connection it is said that the French Army alone has 15,000 war aeroplanes, while England now has 150,000 trained aviators. So advanced has the art of flying become that the aviation service is now the safest branch of service on the war fronts.

Removing White Spots

White spots on a polished table top, caused by hot dishes, can be removed by rubbing lightly with a rag moistened with alcohol. It must be done skillfully so that the spirit will not injure the varnish. Then rub with linseed oil.

Diluted oxalic acid will also remove the white spot. In any event it is best to apply the remedy as soon after the accident as possible. Always rub with sweet oil or raw linseed oil afterwards.

Spirits of camphor is another good remedy. The spot should be rubbed steadily until it disappears, and the surface then rubbed with linseed oil and a soft piece of cheese cloth. Camphorated oil is said to be better still, and it is also a very good cleanser and polisher.—Southern Furniture Journal.

To Stop Cracks in Wood

The following suggestion for filling cracks in wood may prove helpful:

Put any quantity of fine sawdust of the same kind of wood into an earthen pan and pour boiling water on it; stir it well, and let it remain for a week or ten days, occasionally stirring it; then boil it for some time, and it will be of the consistency of pulp or paste; put it into a coarse cloth and squeeze all the moisture from it. Keep for use, and, when wanted, mix with a sufficient quantity of thin glue to make it into a paste; rub it well into the cracks, and when quite hard and dry clean the work off, and, if carefully done, you will scarcely discern the imperfection.

Make Most of Elasticity

Manufacturers of handles and of light vehicles make the most of wood's elasticity, says Hardwood Record. The difference is so great between a fine, high-grade hickory axe handle and one of the common sort that the experienced chopper who has trained his hands to the "feel" of the resilient hickory sapwood loses all patience if circumstances compel him to use any other. Such a handle absorbs all the jars and jolts of the blow, and the axeman's hands are saved from the sting of the stroke.

Safety Matches and Boxes

The work of making safety matches and the little boxes in which they are packed perhaps represents the most highly-specialized woodworking industry we have, and it is a work in which machines have been so improved that it is all so nearly automatic the cost of production is reduced to hair-splitting fractions that seem almost impossible.—Wood Turning.

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Hardinge Portable
The only unlimited System.
Patrol clock, each $39.60 complete.
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30" Whitney pattern surfacer.
26" Revolving bed double surfacers.
24" Galt, revolving bed.
24" Single surfacers, various makes.
22" Stationary bed surface planer.
12" Fisher, buzz.

Band Saws
42" Fay & Egan power feed rip.
36" Crescent, pedestal.
30" Ideal pedestal, tilting table.
28" Ballantine, bracket.
26" Crescent pedestal (2).
20" Crescent pedestal (2).

Saw Tables
No 5 Crescent, sliding top.
Ballantine variable power feed.
12' Defiance automatic equalizer.
MacGregor Gourlay railway cut-off.
6' Crescent iron frame swing.
Ideal, variety.

Mortisers
Cowan hollow chisel, M190.
Galt upright, compound table.
No. 2 Smart foot power.
No. 1 Smart foot power.
No. 1 Defiance, automatic.

Moulders
13" Clark-Demill four-side.
12" Cowan four side.
10" Houston four side.
6" Cowan four side.
6" Dundas sash sticker.

Sanders
24" Fay double drum.
12" C.M.C. disk and drum.
18" Crescent disk, adjustable table (2).

Clothespin Machinery
Humphrey No. 8 giant slab resaw.
Humphrey gang slitter.
Humphrey cylinder cutting-off machine.
Humphrey automatic lathes (6).
Humphrey double slotters (4).

Miscellaneous
Fay & Egan 12 spindle dovetailer.
MacGregor Gourlay 12 spindle dovetailer.
Cowan dowel machine, M80.
No. 1 Ballantine dowel machine.
Cowan post boring machine, M85G.
Galt blind slat re-saw.
Cowan sash clamp.
Egan sash and door tenoner.
No. 4A Fox wood trimmer.
Single spindle wood shaper.
Defiance handle shapers.
48" 3 saw edger.
20" American wood scraper.
16" Ideal wood lathes (3).
4-head rounding machines.
Cowan spindle carver, M63.
Cowan veneer press screws.
No. 1 Hart automatic saw filer.

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Tapes for your
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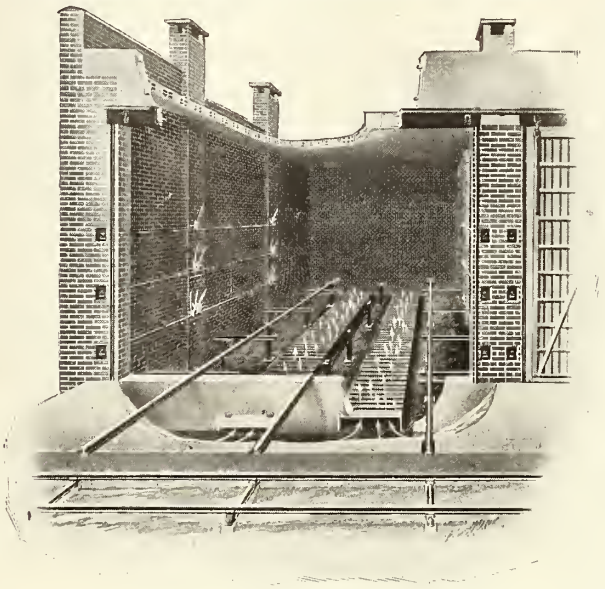
The majority is generally right.



Sometimes a man does not have time to make complete and careful investigation of dry kilns. Then his best tip is to buy what those people who have investigated have decided upon.

More NATIONAL Kilns are sold than any other.

You are safe in selecting the NATIONAL.

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Seven Hundred Machines, including equipment for every woodworking purpose.

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36" Fay & Egan No. 50 Band Saw.
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54" Berlin No. 289 Band Resaw.
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Specials

1—No. 103 Falls Chain Feed Rip and Straight Line Edging Saw.
1—No. 3-B Falls Continuous Feed Glue Jointer
1—No. 55 Mattison Turning Lathe.
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1—No. 198 Wysong & Miles Drawer Fitter.
1—25 Spindle Dodds Dovetailer.
1—42" H. B. Smith Endless Bed Triple Drum Sander.
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1—30" Grand Rapids Graining Machine.

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Greatest selection of select machines. Send us your inquiries.

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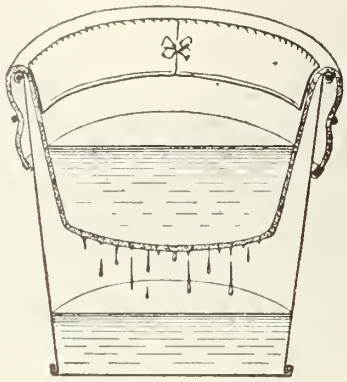
Oil Filter for a Small Plant

A tin can and a felt hat combined, as shown in the illustration, make a first-rate and inexpensive filter for oil in a plant that does not justify the purchase of an



An old hat for an oil filter.

expensive apparatus. If there are holes in the hat, pieces of felt (taken from the brim) can be stitched over them.—Ian Spaander, in Power.

The Mechanical Stoker

By A. C.

The mechanical stoker, which feeds coal and tends fires by machinery, is coming more and more into general use. With a good mechanical stoker one man can tend several furnaces with little labor. There are several different types, and in most of them the coal is fed into a hopper of such size that it need not be often filled. Some stokers work continuously; others only when thrown into gear by the fireman. In the "Roney" stoker the grate bars extend across the furnace and form a series of steps, down which the fuel moves. Each grate bar is hung on pivots at the ends, and is operated by a rocker bar. This rocker bar is driven by a small steam engine with a slow, regular reciprocation, which causes the grate bars to tip so that the coal of its own weight slides from one grate bar to the next. Coal from a hopper falls on to a horizontal plate, and is fed into the top of the grate by a pusher. The rapidity with which the fuel can be fed is regulated by changing the stroke of the pusher and by governing the speed of the engine. Ashes and clinkers collect on the dumping grate at the end of the grate bars, whence they can be dumped into the ash-pit.

This type of grate is well adapted for smoke prevention, for the fresh fuel fed in at the top is rapidly coked, and the volatile gases are easily consumed. The rapidity of feed should be so regulated that no unburned fuel gets past the dump grate. If the fire becomes too thin, there will be a loss of efficiency, due to the excess of air which passes through the burning fuel. It is easy to detect the loss from too much fuel, but not so easy if there is too little fuel. All mechanical stokers in which the movable parts are inside the furnaces are likely to get out of order because of the heat and dirt.

Some will argue that it is a waste of time to have a man take extra pains on work that doesn't need particular attention, but surely that is a small fault compared to that of carelessness or indifferent work on a high-grade job—work that is likely to do more damage than the mere waste of a little time.

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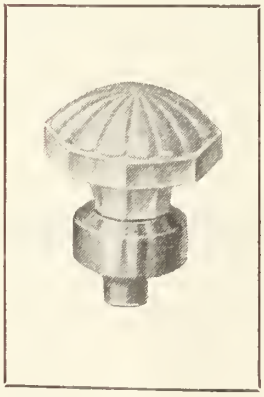
From the smallest Knob down to Casters and everything in between



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Costumer Hooks
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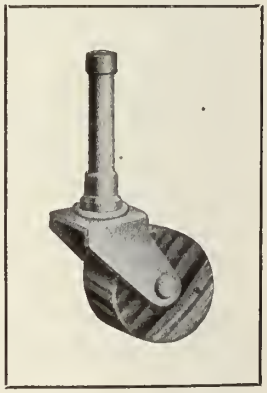
Casters for all purposes



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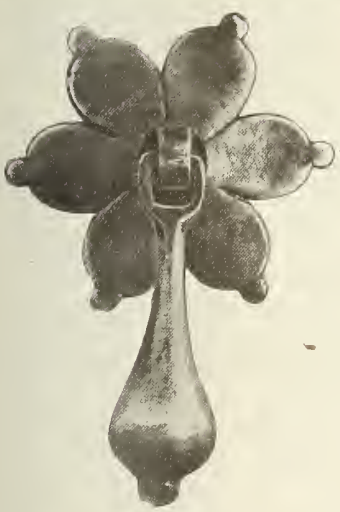

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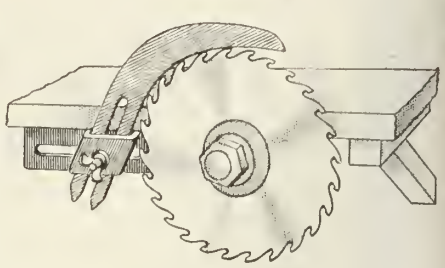

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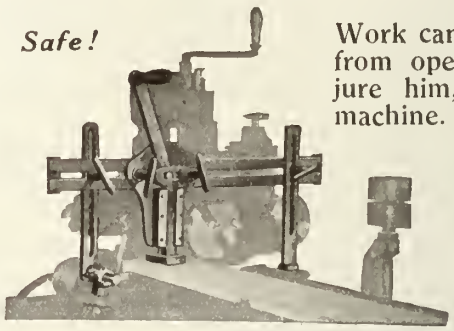

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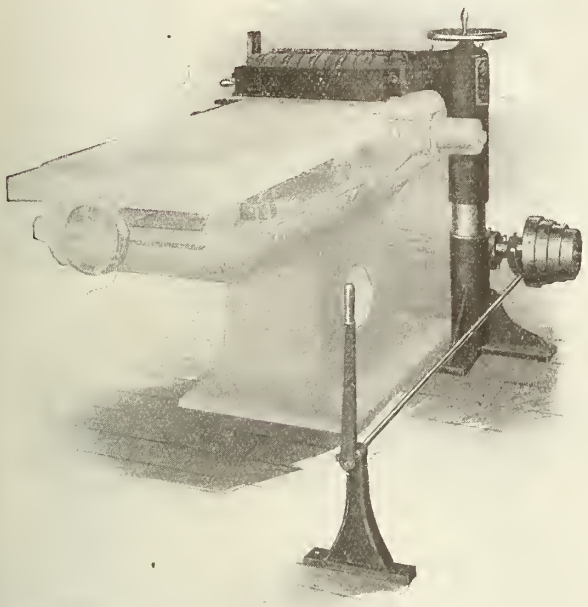

Falls No. 73 Power Feed Attachment

By attaching this machine to your hand jointer you can turn out 4 times as much work as can be done on the hand jointer alone, in truing up and taking the wind out of stock.

This Machine will pay for itself in a short time!

You need the machine—we want to furnish it. Let's get together and talk it over

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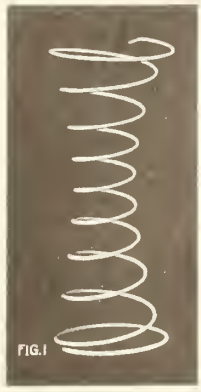

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Constructions for Chairs, Davenports, Carriages and Automobiles.

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The service resulting from 30 years' experience is at your command.

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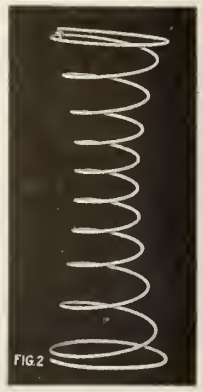

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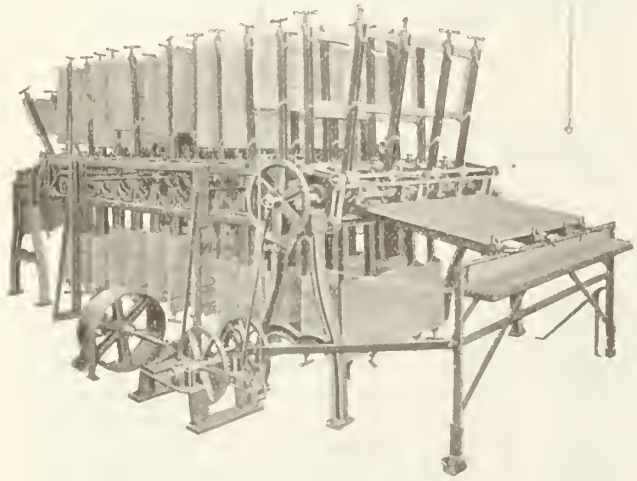

If you do, here is a machine that will save you 60% of the time and labor required to handle your work with hand clamps. This machine is the Billstrom Automatic Glue Clamp Carrier.

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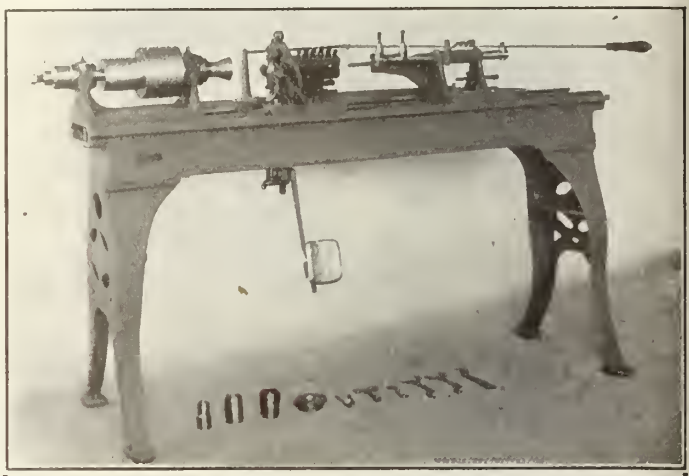

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NEW WAYMOTH WOOD-TURNING LATHE

This machine is most suitable for the production of a wide variety of turnings. In one operation it turns, bores and cuts off wood turnings in any size up to 34 inches in length.

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"Maple Leaf" Grooving Saws

We make special shaped tooth Grooving Saws for special work, round face, bevel face, shear cut and straight face, etc. We manufacture Dado Heads, Mitre Saws, Novelty Saws, Special Tooth Grooving Saws, Rip and Cross-Cut Circular Saws, Concave Saws, Band Saws, Hand Saws, Cross-Cut Saws, etc., etc. Write for Catalogue.

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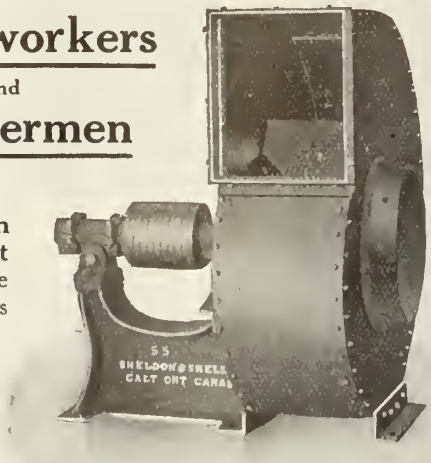

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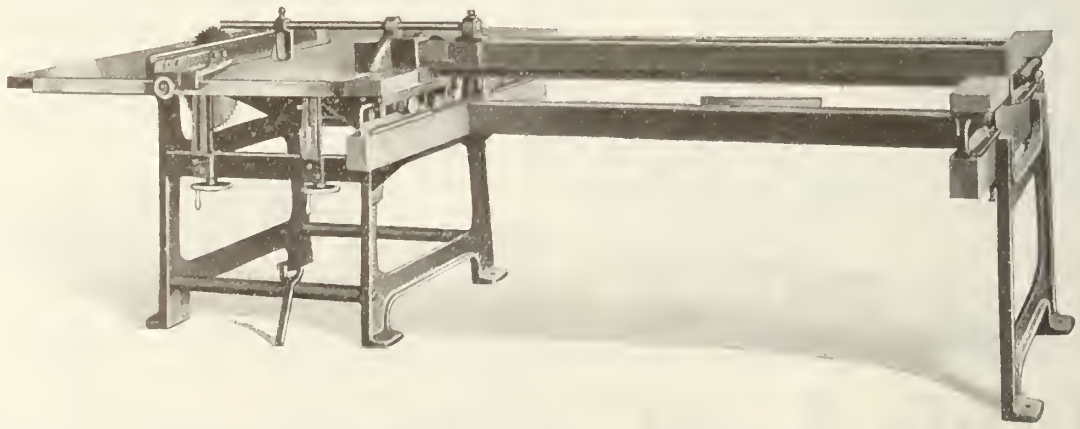

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Roof Framing Made Easy, by Owen B. Maginnis. Published by The Industrial Publication Company, New York. 164 pages, illustrated. Price 50c.

"Carpentry," by Ira S. Griffith. Published in 1916 by The Manual Arts Press. 188 pages, illustrated. Price $1 00.

Handrailing Simplified, by An Experienced Architect. Published by William T. Comstock, New York. 52 pages, illustrated. Price 50c.

How to Join Mouldings; or, The Arts of Mitering and Coping, by Owen B. Maginnis. Published by William T. Comstock, New York. 72 pages, illustrated. Price 50c.

Utilization of Wood-Waste (Second Revised Edition), by Ernst Hubbard. Published in 1915 by Scott, Greenwood & Sons. 192 pages, illustrated. Price $1.50.

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The "Canadian Woodworker" Buyers' Directory

An Index to the Best Equipment and Supplies

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DeVilbiss Mfg. Co., Toledo, Ohio.

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BABBITT METAL
Canada Metal Company, Toronto, Ont.
Hoyt Metal Co., Toronto.

BALL BEARINGS
Chapman Double Ball Bearing Co., Toronto.

BALUSTER LATHES
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Perfection Wood Steaming Retort Company, Parkersburg, W. Va.

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Reynolds Pattern & Machine Co., Moline, Ill.
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Yates Machine Co., P. B., Hamilton, Ont.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

CARS (Transfer)
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Carborundum Co., Niagara Falls, N.Y.

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Canada Machinery Corporation, Galt, Ont.
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Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

CASTERS
Burns & Bassick Co., Bridgeport, Conn.
Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.

CLAMPS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Neilson & Company, J. L., Winnipeg, Man.
Palmer & Sons, Albert E., Owosso, Mich.
Preston Woodworking Machinery Company, Preston, Ont.
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COLUMN MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

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Acme Steel Goods Company of Canada, Ltd.

CRATING LUMBER
Read Bros., Limited, Toronto.

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Galbraith & Co., Ltd., Owen Sound, Ont.

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Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
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Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, Que.
Yates Machine Co., P. B., Hamilton, Ont.

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Cowan & Co., Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, Beloit, Wis.
Shimer Cutter Head Co., Galt, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

DOVETAILING MACHINES
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Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

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Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

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National Dry Kiln Co., Indianapolis, Ind.
Sheldons, Limited, Galt, Ont.

DUST COLLECTORS
Sheldons, Limited, Galt, Ont.

DUST SEPARATORS
Sheldons, Limited, Galt, Ont.

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Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont
Simonds Canada Saw Co., Montreal, Que.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
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Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

EXHAUST FANS
Garlock-Walker Machinery Co., Toronto, Ont.
Sheldons Limited, Galt, Ont.

FEED ATTACHMENTS
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Garlock-Walker Machinery Co., Toronto, Ont.

FILES
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Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass
Yates Machine Co., P. B., Hamilton, Ont.

FLUTING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.

FLUTING AND TWIST MACHINE
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Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.

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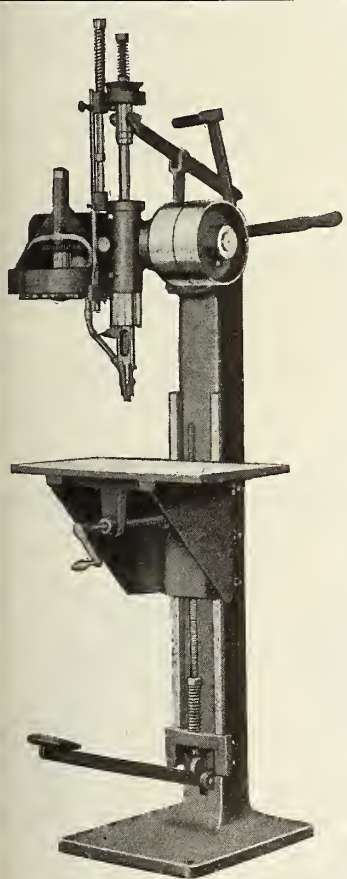

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Jackson, Cochrane & Company, Kitchener, Ont.
Neilson & Company, J. L., Winnipeg.

GLUE HEATERS
Fay & Egan Co., J. A., Cincinnati, Ohio
International Electric Co., Indianapolis, Ind.
Jackson, Cochrane & Company, Kitchener, Ont

GLUE JOINTERS
Canada Machinery Corporation, Galt, Ont
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont
Yates Machine Co., P. B., Hamilton, Ont

GLUE SPREADERS
Fay & Egan Co., J. A., Cincinnati, Ohio
Jackson, Cochrane & Company, Kitchener, Ont

GLUE ROOM EQUIPMENT
Billstrom, Nels. J., Rockford, Ill.
Perrin & Company, W. R., Toronto, Ont

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Canadian Mathews Gravity Carrier Co.

GRINDERS (Cutter)
Fay & Egan Co., J. A., Cincinnati, Ohio
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.

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The Carborundum Co., Niagara Falls, N.Y.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont
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Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Kitchener, Ont

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Mattison Machine Works, C., Beloit, Wis.

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Churchill-Milton Lumber Co., Louisville, Ky.
Thomas & Proetz Lumber Co., St. Louis, Mo.

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Machinery Co. of America, Grand Rapids, Mich.

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Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND SCREWS
Fay & Egan Co., J. A., Cincinnati, Ohio.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
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Yokes Hardware Co., Toronto.
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American Oak Mfrs.' Assn., Memphis, Tenn.
Anderson-Tully Co., Memphis, Tenn.
Atlantic Lumber Company, Toronto.
Banning, Leland G., Cincinnati, Ohio.
Brown & Company, Geo. C., Memphis, Tenn.
Burns & Knapp Lumber Co., Conneautville, Pa.
Churchill-Milton Lumber Co., Louisville, Ky.
Clark & Son, Edward, Toronto, Ont.
Dermott Land & Lumber Co., Chicago, Ill.
Graves, Bigwood Company, Toronto, Ont.
Kersley, Geo., Montreal, Que.
Korn-Conkling Co., Cincinnati, Ohio.
Martin-Barriss Co., Cleveland, Ohio.
Paepcke Leicht Lumber Co., Chicago, Ill.
Payson Smith Lumber Co., Minneapolis, Minn.
Pickrel Walnut Co., St. Louis, Mo.
Probst Lumber Co., Cincinnati, Ohio.
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Fay & Egan Co., J. A., Cincinnati, Ohio.
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
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Yates Machine Co., P. B., Hamilton, Ont.

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Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

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Cowan & Co., Galt, Ont.
Defiance Machine Works.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.

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Acme Veneer & Lumber Co., Cincinnati, Ohio.
American Hardwood Lumber Co., St. Louis, Mo.
Anderson-Tully Co., Memphis, Tenn.
Banning, Leland G., Cincinnati, Ohio.
Barr-Holaday Lumber Co., Greenfield, Ohio.
Brown & Company, Geo. C., Memphis, Tenn.
Churchill, Milton Lumber Co., Louisville, Ky.
Clark & Son, Edward, Toronto, Ont.
Dermott Land & Lumber Co., Chicago, Ill.
Graves, Bigwood Company, Toronto, Ont.
Hartzell, Geo. W., Piqua, Ohio.
Huddleston, Marsh Mahogany Co., New York.
Korn-Conkling Company, Cincinnati, Ohio.
Long-Knight Lumber Co., Indianapolis.
Paepcke Leicht Lumber Company, Chicago, Ill.
Pauze, Wilfrid H., Montreal, Que.
Payson Smith Lumber Co., Minneapolis, Minn.
Pickrel Walnut Co., St. Louis, Mo.
Probst Lumber Co., Cincinnati, Ohio.
Read Bros., Limited, Toronto.
Shreiner Lumber Co., Pittsburgh, Pa.

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Peter Hay Knife Company, Galt, Ont.
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Yates Machine Co., P. B., Hamilton, Ont.

MITRE MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

MITRE SAWS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Simonds Canada Saw Co., Montreal, P.Q.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Reynolds Pattern & Machine Co., Moline, Ill.

PANELS
Waetjen & Co., George L., Milwaukee, Wis.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
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Machinery Co. of America, Grand Rapids, Mich.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

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Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Wallace & Company, Chicago, Ill.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PLANING MILL MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PRESSES (Veneer)
Canada Machinery Corporation, Galt, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Perrin & Co., Wm. R., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.

PULLEYS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Machinery Co. of America, Grand Rapids, Mich.

RED GUM LUMBER
Gum Lumber Manufacturers' Association.

RECORDERS (TIME)
International Time Recording Co., Toronto, Ont.
Signal Systems, Limited, Toronto, Ont.

RESAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

RIM AND FELLOE MACHINERY
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.

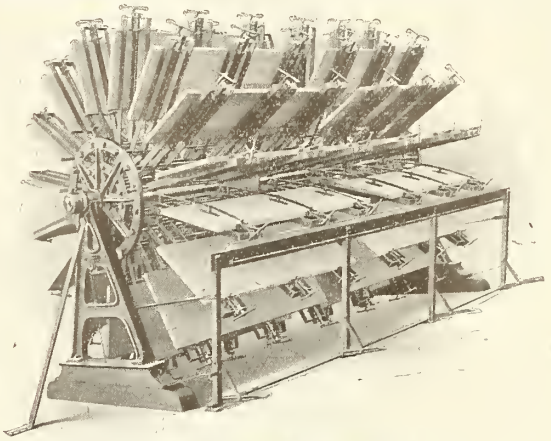
RIP SAWING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Sinker-Davis Company, Indianapolis, Ind.
Yates Machine Co., P. B., Hamilton, Ont.

Palmer's Perpetual Revolving Clamp

is the most practical, durable and rapid device for the clamping of edge joints and will show you a great saving in time, floor space and labor.

WRITE FOR FULL PARTICULARS TO

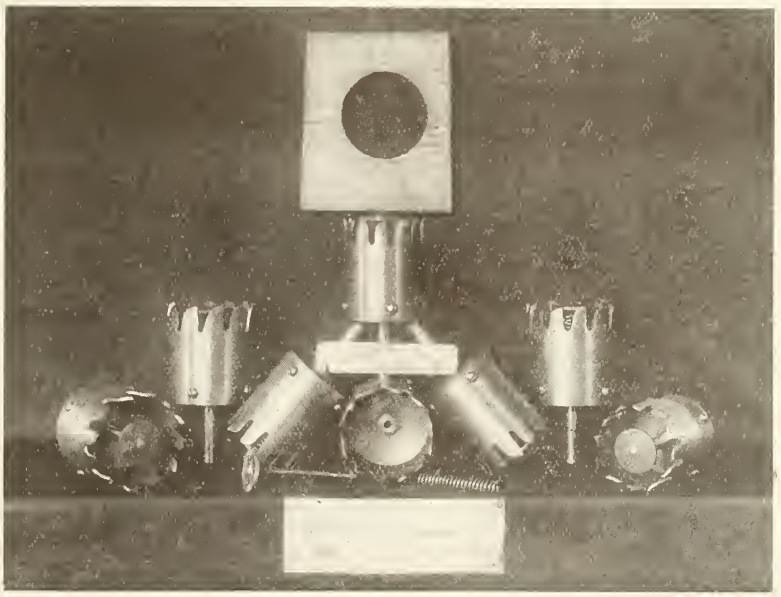
ALBERT E. PALMER & SONS
Owosso, Mich., U. S. A.



"BEAVER" Cylinder Saws for "Bethlehem" Shell Box Diaphragms

These saws will cut straight holes in veneer diaphragms rapidly and without tearing the different plys asunder. They can be set and filed as any ordinary saw, thus holding their clearance and size. Our latest type saw is fitted with new style core ejector. This kicker bears on exact centre of wood eliminating all friction.

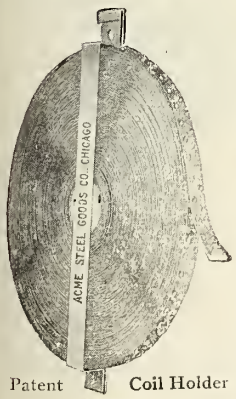
We also supply special cutter heads for taper nose blocks in 4.5" and 18 P. R. Shell Boxes.



RADCLIFF SAW MFG. CO., LIMITED
Agents for L. & I. J. White Co., Machine Knives

550 DUNDAS ST.
TORONTO, ONT.

"DOT EMBOSSED"
300 Foot Coil



Patent Coil Holder

STEEL BOX STRAPPING

SMOOTH EDGES—CONTINUOUS LENGTHS
COIL HOLDERS SUPPLIED
LACQUERED—GALVANIZED—BRIGHT

Write now for Catalog.

ACME STEEL GOODS CO.
OF CANADA, LIMITED
20 St. Nicholas St. MONTREAL, Que.

Corrugated Joint Fasteners

In bulk in Barrels and Boxes.

In coils for Automatic Driving Machines.

PARALLEL SAW EDGE

DIVERGENT SAW EDGE

"Canadian Woodworker" Buyers' Directory—Continued

SANDERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Nash, J. M., Milwaukee, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SASH, DOOR & BLIND MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SAWS
Atkins & Co., E. C., Indianapolis, Ind.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Radcliff Saw Mfg. Company, Toronto, Ont.
Shurly-Dietrich, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Smith Co., Ltd., R. H., St. Catharines, Ont.

SAW GUMMERS, ALOXITE
The Carborundum Co., Niagara Falls, N.Y.

SAW SWAGES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Machinery Co. of America, Grand Rapids, Mich.
Simonds Canada Saw Co., Montreal, Que.

SAW TABLES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SCRAPING MACHINES
Canada Machinery Corporation, Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass

SCREW DRIVING MACHINERY
Canada Machinery Corporation, Galt, Ont.
Reynolds Pattern & Machine Works, Moline, Ill

SCROLL SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

SECOND-HAND MACHINERY
Cowan & Co., Galt, Ont.
Petrie, H. W
Wayne Machinery Co., Fort Wayne, Ind.

SHAPERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Whitney & Sons, Baxter D., Winchendon, Mass
Yates Machine Co., P. B., Hamilton, Ont.

SHARPENING TOOLS
The Carborundum Co., Niagara Falls, N.Y.

SHAVING COLLECTORS
Sheldons Limited, Galt, Ont.

SHOOK BUNDLER
Neilson & Company, J. L. Winnipeg, Man.

SPRINGS FOR UPHOLSTERY
Foster Bros. Mfg. Co., Utica, N.Y.

STAINS
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.
Schmidt, Walter K., Grand Rapids, Mich.

STEAM APPLIANCES
Darling Bros., Montreal.
Morrison Brass Mfg. Co., Toronto, Ont.

SINGLE SPINDLE BOXING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

STAVE SAWING MACHINE
Whitney & Sons, Baxter D., Winchendon, Mass

STEAM TRAPS
Canadian Morehead Mfg. Co., Woodstock, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

STEEL BOX STRAPPING
Acme Steel Goods Co. of Canada, Ltd.

STEEL SHELL BOX BANDS
Acme Steel Goods Co. of Canada, Ltd.

SURFACERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

SWING SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

TABLE LEG LATHES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Mattison Machine Works, C., Beloit, Wis.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

TABLE SLIDES
Walter & Co., B., Wabash, Ind.

TENONING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

TRANSMISSION MACHINERY
Dodge Mfg. Co., Ltd., Toronto, Ont.

TELEPHONES—PRIVATE SYSTEMS
Signal Systems, Limited, Toronto, Ont.

TRIMMERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

TRUCKS
Sheldons Limited, Galt, Ont.
National Dry Kiln Co., Indianapolis, Ind.

TURNING MACHINES
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Mattison Machine Works, C., Beloit, Wis.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

UNDER-CUT SELF-FEEDING FACE PLANER
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

VARNISHES
Ault & Wiborg Company, Toronto, Ont.

VARNISH SPRAYERS
DeVilbiss Mfg. Co., Toledo, Ohio.

VENEERS
Acme Veneer & Lumber Co., Cincinnati, Ohio.
Barnaby, Chas. A., Greencastle, Ind.
Central Veneer Co., Huntington, W. Virginia.
Clark Veneer Co., Walter, Grand Rapids, Mich.
Empire Veneer Company, Chicago, Ill.
Hartzell, Geo. W., Piqua, Ohio.
Haughton Veneer Company, Chicago, Ill.
Hoffman Bros. Company, Fort Wayne, Ind.
Geo. Kersley, Montreal, Que.
Nartzik, J. J., Chicago, Ill.
Ohio Veneer Company, Cincinnati, Ohio.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Roberts Veneer Co., New Albany, Ind.
Toronto Veneer Company, Toronto, Ont.
Waetjen & Co., George L., Milwaukee, Wis.

VENEER TAPE
Ideal Coated Paper Co., Brookfield, Mass.

VENTILATING APPARATUS
Sheldons Limited, Galt, Ont.

VENEER JOINTERS
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.

VENEER PRESSES (Hand and Power)
Canada Machinery Corporation, Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Perrin & Company, Wm. R., Toronto, Ont.

VISES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Company, Montreal, Que.

WAGON AND CARRIAGE MACHINERY
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass
Yates Machine Co., P. B., Hamilton, Ont.

WATCHMAN'S CLOCKS
Signal Systems, Limited, Toronto, Ont.

WOOD FINISHES
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

WOOD PULLEYS
Dodge Mfg. Co., Ltd., Toronto, Ont.

WOOD TURNING MACHINERY
Canada Machinery Corporation, Galt, Ont.
Defiance Machine Works, Defiance, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Waymoth & Co., A. D., Fitchburg, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

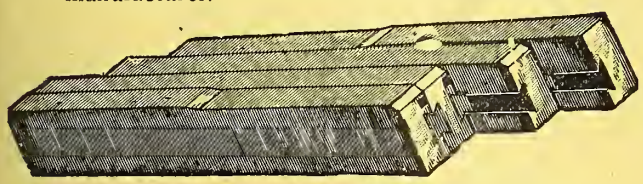
WORK BENCHES
Fay & Egan Co., J. A., Cincinnati, Ohio.

WOODWORKING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Elliot Woodworker Limited, Toronto, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Reynolds Pattern & Machine Works, Moline, Ill.

WHEELS, Grinding, Carborundum and Aloxite
The Carborundum Co., Niagara Falls, N.Y.

Making TABLE-SLIDES is a Specialty Business

For more than TWENTY-FIVE YEARS we have made TABLE SLIDES exclusively. Our Factory is equipped with Special Machinery which enables us to make SLIDES,—BETTER and CHEAPER than the furniture manufacturer.



Canadian Table makers are rapidly adopting WABASH SLIDES

Because { They ELIMINATE SLIDE TROUBLES / Are CHEAPER and BETTER

Reduced Costs / **Increased Out-put** { BY USING **WABASH SLIDES**

MADE BY

B. Walter & Company

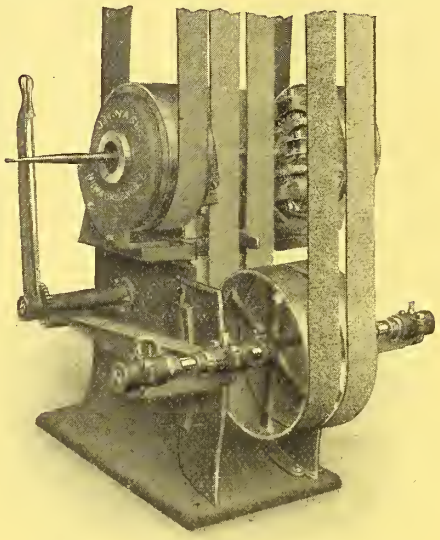
Wabash, Ind.

The Largest EXCLUSIVE TABLE-SLIDE Manufacturers in America

ESTABLISHED-1887

YOU ARE

LOSING

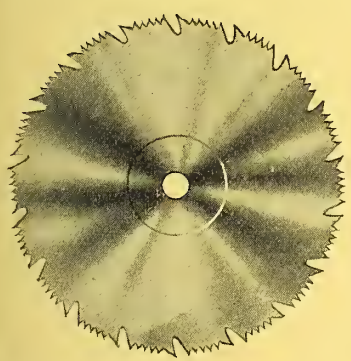


$4 to $5 every day if you haven't the Nash Sander for your plain or swelled round work.

It is making that saving in many factories.

Why not in yours?

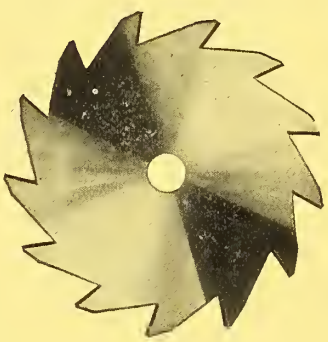
J. M. NASH, MILWAUKEE, Wis.



ATKINS

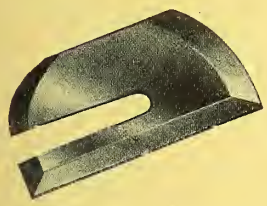
STERLING QUALITY

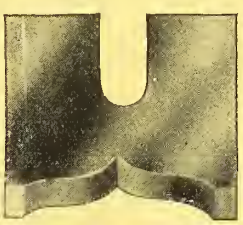
SAWS and KNIVES



The best steel—the most careful and accurate workmanship—the equipment that will eventually save you money.

Atkins Sterling Quality Saws and Knives are proving their superiority by competitive tests in the largest plants of the country. We welcome your most careful investigation, as we know the satisfaction that will result.





Write to-day for our Knife Booklet "C W" and Pattern Template Paper.

E. C. ATKINS & CO.

Makers of Sterling Saws

Factory—HAMILTON, Ont. **Vancouver Branch—109 Powell Street**

for Rubbing Varnish

THE MATTISON ELECTRIC "RUBBER"

Doubles Man's Capacity

No man can rub uniformly by hand all day long. As the day closes he loses efficiency and the finish or output must suffer. But with this little electric rubbing machine he can produce exactly the same high grade work at four o'clock in the afternoon as he did at nine in the morning. There is no hard labor connected with operating it—all that is necessary is for the operator to guide it over the surface.

The machine requires no hose, piping, or any special equipment. All you have to do is to attach it to a light socket, turn the switch and go ahead. When idle, it costs nothing for operation or up-keep; and when running, consumes about as much current as three or four incandescent lamps. By doing two men's work every day, it practically pays for itself every three to six months.

If you are interested, why not let us send you our large descriptive circular on this machine?

C. Mattison Machine Works

883 Fifth St., Beloit, Wisconsin

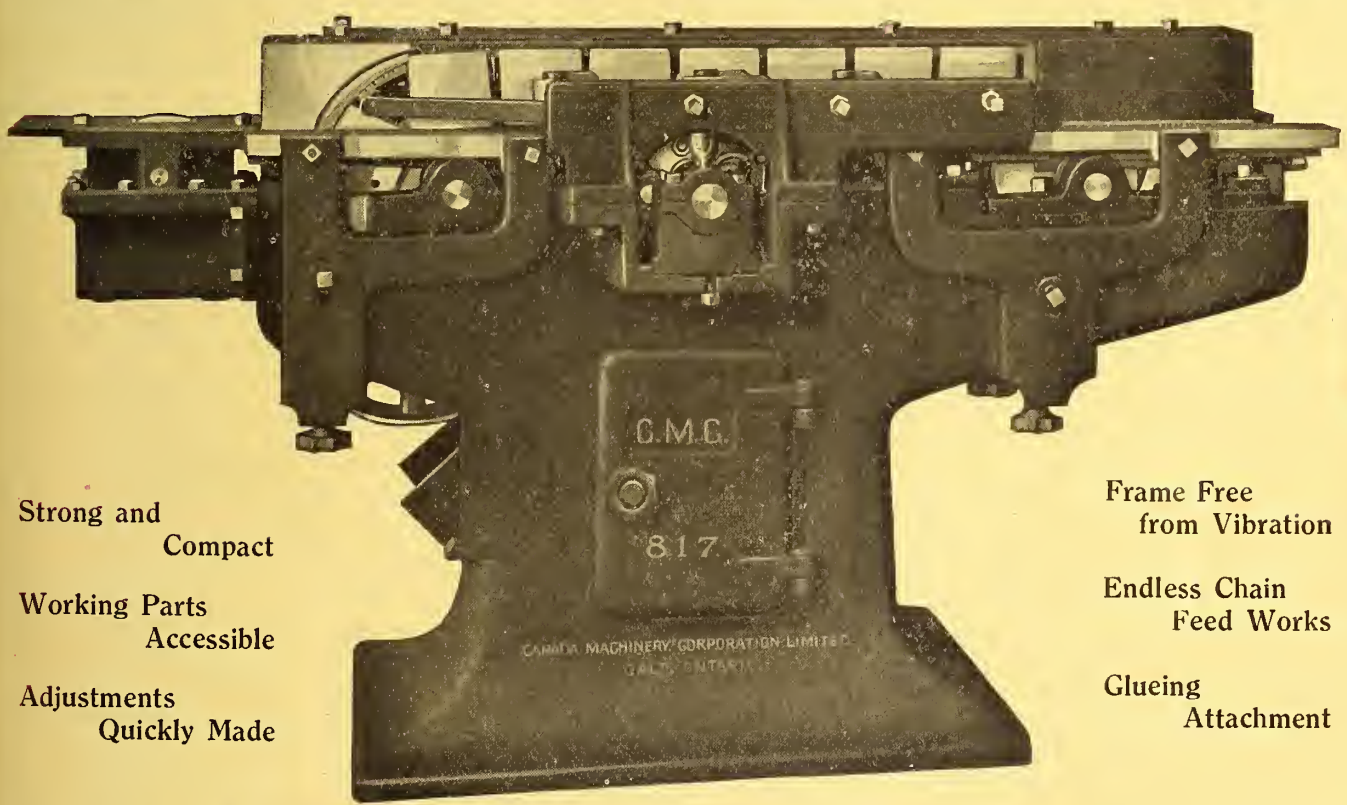
Volume Seventeen TORONTO, JULY, 1917 Number Seven

CANADIAN WOODWORKER and Furniture Manufacturer

All-Round Box Factory Efficiency

should be the aim of every superintendent. This cannot be obtained without first-class machinery. Your plant is not complete without our

No. 817 Box Board Matcher



Strong and Compact

Working Parts Accessible

Adjustments Quickly Made

Frame Free from Vibration

Endless Chain Feed Works

Glueing Attachment

This machine is specially designed for use in box factories for matching and making glue joints. Short pieces can be jointed as well as long boards; thin material as well as thick. Rate of speed only limited by ability of operator to handle its product.

Ask for Bulletin

CANADA MACHINERY CORPORATION
LIMITED

Toronto Showrooms: Brock Avenue Subway GALT, ONT.

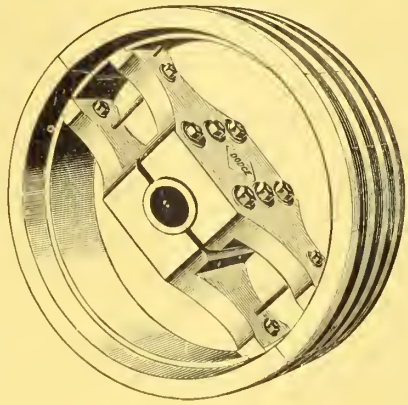
Shell Box Production Costs

PULLEYS

No Keys

No Set Screws

In Perfect Balance



Lighter

Stronger

Better Belt Surface

The Dodge Standard Wood Split Pulley

The Wood Split Pulley is better than either cast iron split pulleys or steel split pulleys for the following reasons—

The wood pulley is lighter, stronger, better balanced and provides a very much better belt surface. It costs 33 1-3% less money and provides 50% more returns in horse-power value. It may be run at very much higher speeds with no danger of bursting—also it may be had quicker and in a greater range of sizes.

It costs less to get—less to put on—and less to keep.

We make approximately 300 Dodge pulleys every day—everybody uses them.

There are more Dodge pulleys making ammunition than any other kind—you can get them quick.

Every pulley is thoroughly nailed. Every pulley is guaranteed for Double Belts.

We are Canada's greatest pulley makers.

If you have not our Books, write us

DODGE MANUFACTURING COMPANY

Toronto - - Montreal

GARLOCK-WALKER MACHINERY CO. LIMITED

32 FRONT ST. WEST, **TORONTO** TELEPHONE MAIN 5346

Mr. Box Manufacturer,

Have *you* utilized our services in your plant layout or equipment?

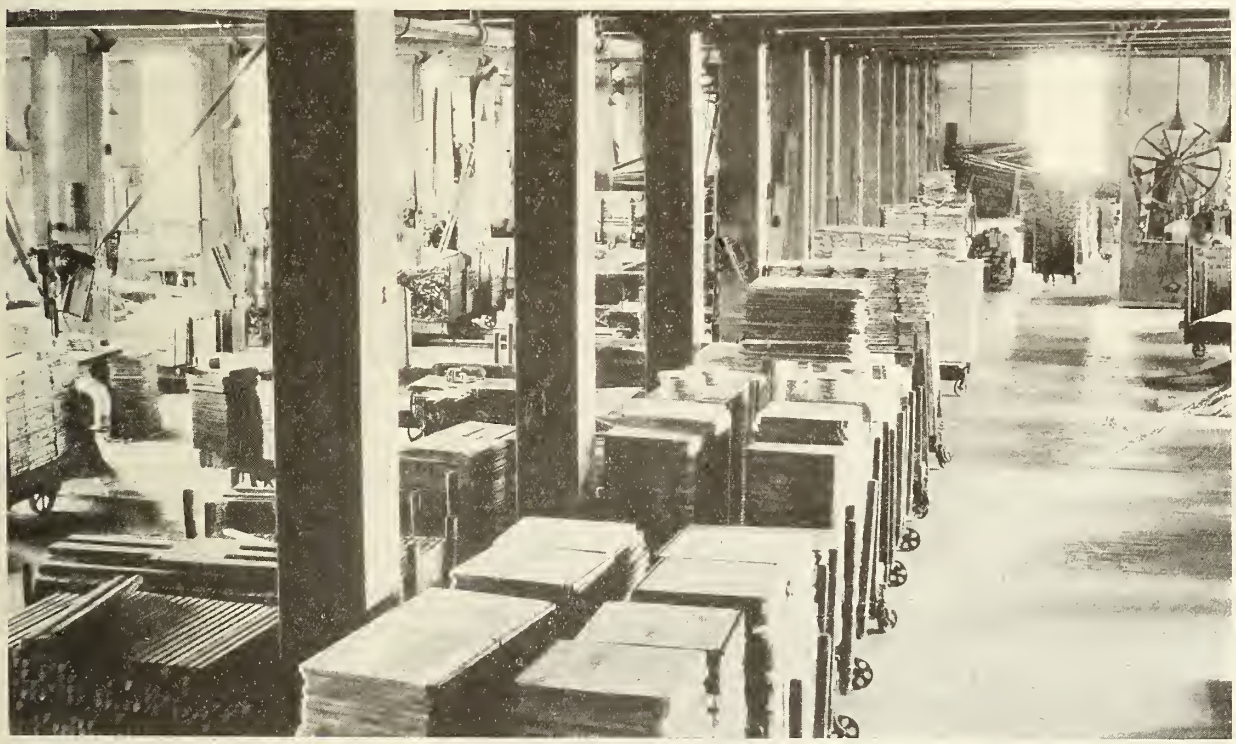
Included in the firms who have, are:

Toronto Furniture Company, Limited, Toronto.
Henry Morgan Company, Montreal.
Office Specialty Company, Newmarket.
W. C. Edwards Company, Ottawa.
and many others.

RESULTS:—

To Munition Board:—Increased Production—Prompt shipments.
To our customers:—Greater production, continued orders, more profits.
To us:—Satisfied customers—more business.

Tell us your troubles—Let us help *you*



Section of the Plant of Toronto Furniture Company.
Shell Box Equipment furnished by

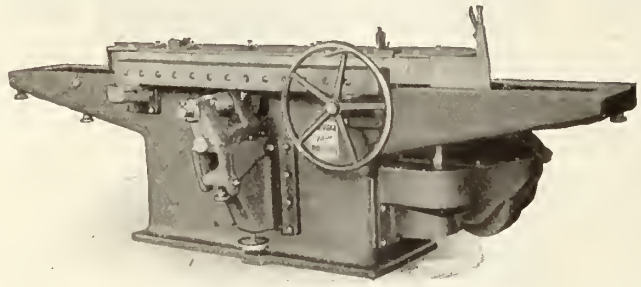
Garlock-Walker Machinery Company, Limited
32 Front Street West, Toronto, Ont.

METAL and WOODWORKING MACHINERY of all Kinds

YOU CAN LAUGH

at the High Prices of Lumber and Labor by installing a

Falls No. 3-B Continuous Feed Glue Jointer



that will take the place of 5 hand jointers with operators in making glue joints. In other words you reduce your cost of producing glue joints by 500 per cent.

You ought to know all about this machine. Send for circular and sample of work done.

Manufactured by—

Falls Machine Co.

Sheboygan Falls - Wis., U.S.A.

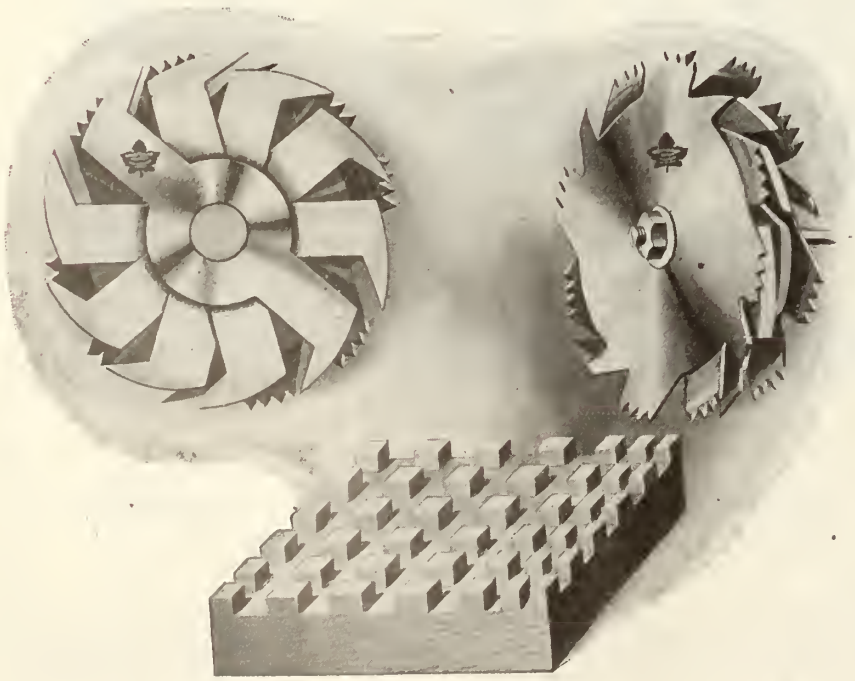
Exclusive Canadian Representatives:

Garlock-Walker Machinery Co., Ltd.

32 Front St. West - TORONTO, CANADA

It Pays to Use

"Maple Leaf" Saws



We manufacture—

Bands,

all kinds of

Special Circular Saws

for Special work,

Cross Cut Saws,
Gang Saws,
Grooving Saws,
Chamfering Saws,
Concave Saws,
etc., etc.

EVERY SAW GUARANTEED.

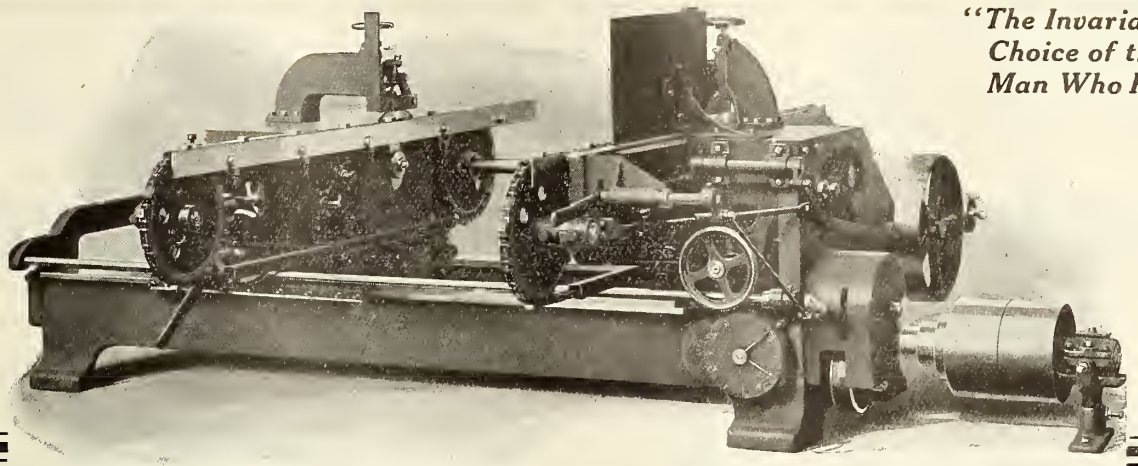
Write for Catalogue

Shurly-Dietrich Co., Limited

GALT - CANADA

Vancouver, B.C. Hull, Quebec

"The Invariable Choice of the Man Who Knows"



Keeping the Hopper Full and Feeding

Constitutes the chief duty of the operator when equalizing stock on a Yates No. 229 Automatic Double Cut-off Saw.

Once adjusted to cut the proper length, stock is piled into the hopper in armful lots, the feed is started and the operator "lets her go."

From then on his chief concern is to **keep the hopper full.**

The continuous feed action of the

Yates No. 229 Double Cut-off Saw

(Hopper Feed)

is accomplished by means of endless roller bearing chains fitted at equal intervals with steel feeding blocks. Each pair of feeding blocks in turn carries the bottom board of the stock past the equalizing saws and delivers it to the off bearer accurately cut to length.

Unlike other types of equalizers its output is **continuous** and entirely independent of the operator's inclination. Yet in spite of a greatly multiplied production, operators say it requires less physical exertion than the ordinary reciprocating type.

If you want greater shook production in your box plant, write today for our circular No. 229

P. B. Yates Machine Company Ltd.

HAMILTON, ONT. CANADA

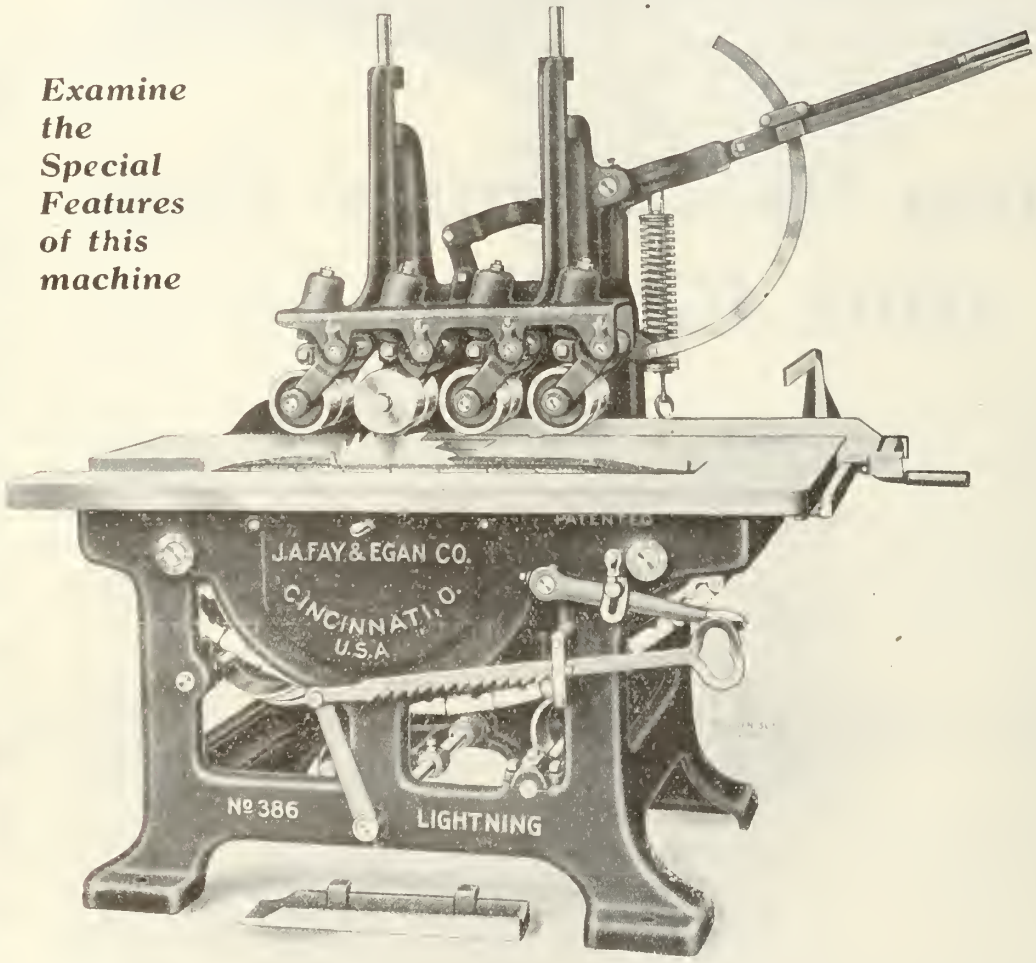
U. S. Plant, Beloit, Wis.

Yates

New Straight Edge
Ripping and Jointing Machine

Makes perfect straight joint ready for glueing
Built in two sizes

Examine the Special Features of this machine



No. 386 Straight Edge Ripping and Jointing Machine.

Prevents any twisting on either long or short stock.

Saw arbor easily accessible for oiling.

Double feed chain of flat milled links, each link removable and interchangeable.

Instantaneous adjustment of all rolls easily made and automatically locked at any point.

Spring counterbalance makes roll adjustment easy.

Saw blade easily accessible by removing plate.

Chain adjustable above table for rough, crooked, or finished stock.

Saves 33⅓ to 50 per cent. in Wages, 10 per cent. in lumber and also uses up your waste stock

NOTE—**Saw cuts from below** and all sawdust and slivers are drawn down and away from the saw and do not scatter over the work and get into the operator's *eyes, ears, nose and mouth*, as in the case where saw cuts from above.

Circulars fully describing this new machine will be gladly mailed to all interested parties

Jackson, Cochrane & Company
KITCHENER, ONTARIO

The "Shimer Limited" Expansion Head

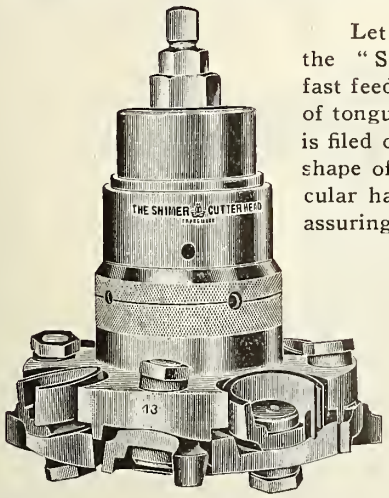


Fig. 627

Let us draw your attention to the advantages of using the "SHIMER CUTTER HEAD" for general Mill and fast feed Planer work. The Cutter is turned to cut the shape of tongue and groove desired, so that to sharpen the cutter it is filed or ground on its face, guaranteeing the user the same shape of cut during the life of the cutter. The bit being circular has from 3½ in. to 5 in. cutting length to the cutter, assuring long wearing life to the cutters.

Note that the cutter, being fastened to a concave seat on a compound angle, assures the user of the proper clearance of cutters, consequently they never burn.

These heads are fitted with or without the Self-Centering Sleeve, and made Expansion or Solid, to suit the customer's wishes.

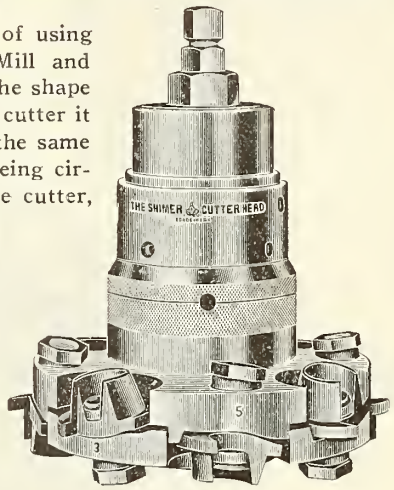


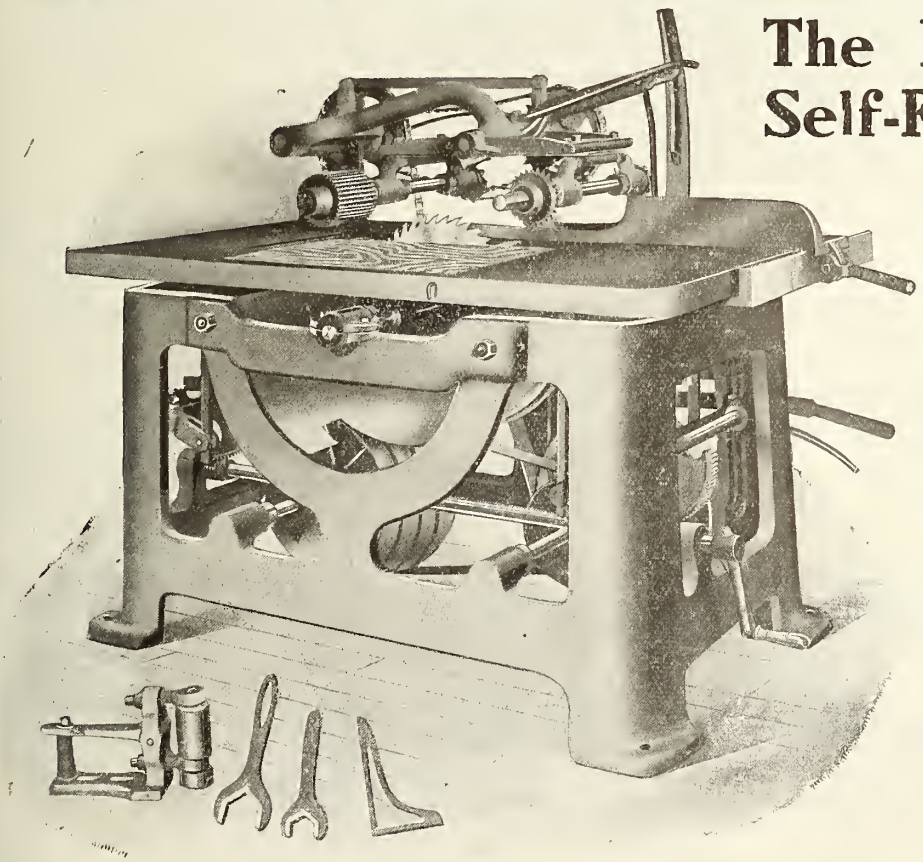
Fig. 268

Shimer Heads have been in use for sixty years, and their reliability and reputation have spoken for them in the past. Let us know your wants and we will guarantee their reliability at the present.

SHIMER CUTTER HEAD CO. OF CANADA, LIMITED

Successors to Samuel J. Shimer & Sons, Inc.

GALT, ONTARIO



The New Hoosier Self-Feed Rip Saw

This is our Standard or No. 1 Hoosier Self Feed Rip Saw, which is now built with hinged upper feed works so that they can be quickly and easily raised up out of the way and the machine used for hand-feed work.

The machine is capable of ripping as thick as 6 in. and as wide as 20 in., and can be used for single, gang, or bevel ripping, the feed being strong enough to pull six saws through 1 in. stock. Four rates of feed are provided from 35 to 150 ft. per minute.

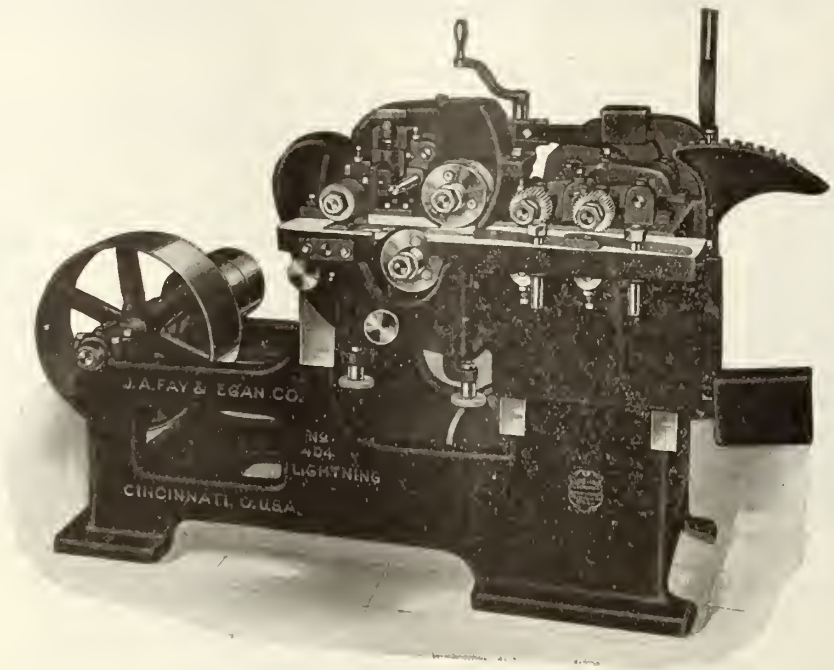
To take care of special ripping problems we build Hoosier Rip Saws in seven other styles.

For further information address

The—

Sinker-Davis Company

INDIANAPOLIS, IND.



A NEW MACHINE FOR MAKING PENCILS, SKEWERS, DOWELS, AND ESPECIALLY *FLAG STICKS.*

PENCILS — Stock of foreign made pencils, imported before the war, are exhausted—a new supply must be manufactured. This machine makes the wood part, round, hexaround or hexagon.

SKEWERS — Always in big demand—a good staple product—made on a No. 404.

DOWELS—More used now than ever—big demand for use in wood ship and small boat construction — No. 404 makes them.

FLAGSTICKS — Right now stocks are completely exhausted—big demand unsatisfied—market will continue strong—No. 404 the only real flag-sticker made.

This is a new big production machine — Get one now—It will pay you well—Ask for Bulletin E-15.

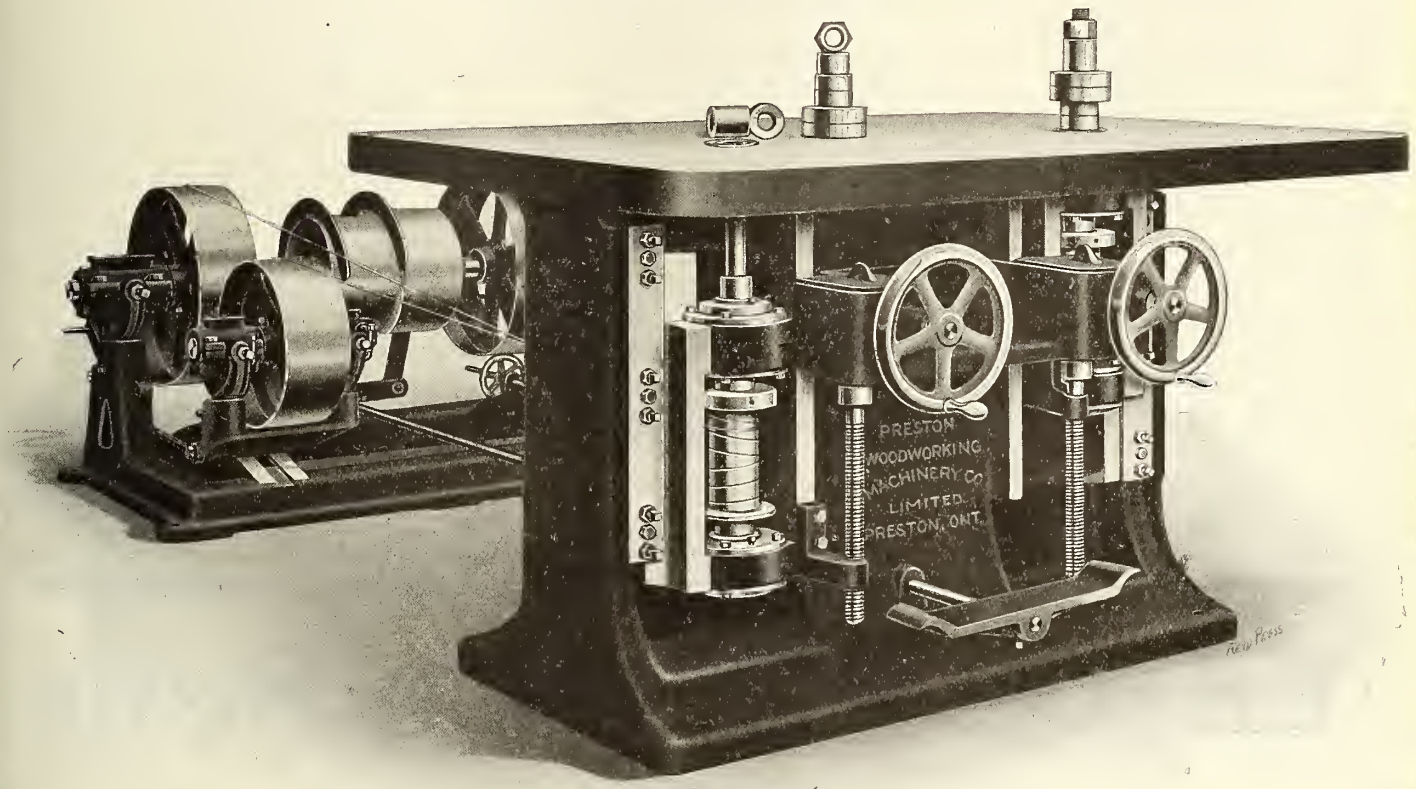
J. A. FAY & EGAN CO.

153-173 W. Front Street CINCINNATI, OHIO

"Treat your machine as a living friend."

Don't Waste Time

for which you are paying big money by having a Machine in your plant which is not giving you a maximum of production every day



No. 162 High-Speed Ball-Bearing Shaper

SEE THIS MACHINE!

It's built absolutely on honor, and will turn out 100% MORE WORK than the ordinary shaper which you are now using. That's our claim; twice the amount of work and much easier on the operator. Is it worth your while to cut your shaper cost in two? If so, drop us a line for more particulars.

THE CHEVROLET MOTOR CO. ARE USING 6 OF THESE MACHINES IN THEIR PLANT AT OSHAWA

DIMENSIONS, WEIGHTS and SPEEDS

Floor Space, 120 in. x 58 in. Net Weight, 2650 lbs. Shipping Weight, 2750 lbs. Tight and Loose Pulleys on Countershaft, 10 in. x 6 in. Driving Pulleys on Countershaft, 18 in. x 5 in. Idler Pulleys, 14 in. x 5 in. R.P.M. Countershaft, 1200. Pulley on Spindle, 3⅛ in. x 6 in. R.P.M. Spindle, 7000. Diameter Spindle, 2 3/16 in. Spindle Centres, 28 in. Table, 58 in. x 41 in. Diameter Spindle Top, 1¼ in. Horse Power Required, 3. Front Projection, 17 in. Height, 35 in.

"The Machine you want in your plant is not the cheapest machine to buy but the machine that will save you the most money to use."

The Preston Woodworking Machinery Co. Limited, Preston, Ont.

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CANADIAN HARDWOODS—winter cut **Birch, Basswood, Maple**

Ontario and Quebec Stocks, East or West, rail or water shipment direct from mill to factory.

Let us quote you on bored diaphragms for Bethlehem boxes, interlocking style, guaranteed to meet Imperial Munition Board requirements.

We Commend to Your Notice:

Our lumber is reliable, our grades uniform, our shipments prompt, and receive personal supervision; our prices consistent. We have had long experience. We desire to serve.

We were Really Fortunate in the recent arrival of large, Prime, Figury

African Mahogany Logs

which we are now cutting into

1/28″ VENEER

These logs will produce at least TWO MILLION feet of veneer in:

Mottle—Broken Stripe—Straight Stripe Figure

In widths from 14″ to 28″. A large percentage in right width and figure for phonograph cases.

Advise promptly if you wish to see samples.

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2254 Lumber St. CHICAGO **33 W. 42nd St., NEW YORK CITY**

Established 1873

GILLIES BROS., LIMITED

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Manufacturers of

White Pine *Red Pine* *Spruce*

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5/4 x 10 x 12/16	24,000
WHITE PINE MILL CULLS	
8/4 x 4 and up x 6/16	100,000
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RED PINE (NORWAY) MILL RUN, Clear Out and Mill Culls Out	
4/4 x 4-5-6 x 10/16	400,000
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Saint Francis Basin Band Sawed Oak

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It is better to ***have*** *a car in transit than to* ***wish*** *you had*

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Send us a list of your requirements. — Delivered Prices will be cheerfully quoted.

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Mill—PROCTOR, Ark. **Main Office—MEMPHIS, Tenn.**

We specialize in Tennessee Aromatic Red Cedar

"Made in America"

RED GUM

("America's Finest Cabinet Wood")

IS THE "LIFE-SAVER"

of the furniture trade in these disturbing days. *Gum's only competitors* as a pre-eminent furniture and trim wood are the woods formerly imported but *now increasingly difficult to get.*

It is to the credit of American furniture *manufacturers, retailers* and *users* that they now *acknowledge the advantage to them* of having available (and of *relying* on) so wonderfully beautiful and dependable a furniture wood as American *Gum.*

It is to the credit of *Gum* manufacturers that they are *not* taking unfair advantage of *the BOOM IN Gum* to exact unreasonable prices.

Gum at present prices is *the one big, best buy* in the whole furniture world, for maker, seller and consumer. There's money in Gum for *You.*

A convincing fact as to RED GUM'S growing prestige is that it enjoys increasing demand among the best judges of value—artistic value, utilitarian value and economic value. (There are no other kinds.) "GUM HAS COME."

Furniture Manufacturers and Furniture Retailers who wish detailed proof as to the *salability, dependability* and *commercial desirability* of *RED GUM,* are invited to correspond with

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Dry Spruce and Birch

Good Stocks, Prompt Shipments, Satisfaction

C. A. SPENCER, Limited

Wholesale Dealers in Rough and Dressed Lumber

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We carry at
NEW ALBANY, IND.

Genuine Indiana Plain and Quartered Oak, Poplar

At GLENDORA, MISS.

Cypress, Gum, Cottonwood, Oak

SEND US YOUR INQUIRIES

We have dry stock on hand and can make quick shipment

American Hardwood Lumber Co.

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Large stock of—

Dry Ash, Quartered Oak Plain Oak and Gum

Shipments from — NASHVILLE, Tenn., NEW ORLEANS, La., and BENTON, Ark.

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Ash, Maple, Hickory, Chestnut, Basswood and Poplar

Prices and stock list on request

Burns & Knapp

Lumber Company

CONNEAUTVILLE, PA.

Dermott Offers You, Mr. Buyer:

QUARTERED WHITE OAK

3 cars 1 in. firsts and seconds.
1 car 1¼ in. firsts and seconds.
2 cars 1½ in. firsts and seconds.
1 car 2 in. firsts and seconds.
5 cars 1 in. No. 1 common.
2 cars 1¼ in. No. 1 common
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PLAIN WHITE OAK

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2 cars 1½ in. firsts and seconds.
2 cars 1¾ in. firsts and seconds.
5 cars 2 in. firsts and seconds.
½ car 2½ in. firsts and seconds.
½ car 3 in. firsts and seconds.
5 cars 1 in. No. 1 common.
2 cars 1¼ in. No. 1 common.
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PLAIN RED OAK

4 cars 1 in. firsts and seconds.
1 car 1¼ in. firsts and seconds.
1 car 1½ in. firsts and seconds.
5 cars 1 in. No. 1 common.
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1 car 1½ in. No. 1 common.

PLAIN RED GUM

5 cars 1 in. firsts and seconds.
2 cars 1¼ in. firsts and seconds.
1 car 1½ in. firsts and seconds.
5 cars 1 in. No. 1 common.
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7 cars 1 in. firsts and seconds.
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2 cars 1½ in. firsts and seconds.
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5 cars 1 in. No. 1 common.
1 car 1¼ No. 1 common.
1 car 1½ in. No. 1 common.
1 car 2 in. No. 1 common.

Will be pleased to name you prices on any items in Southern Hardwoods. If you require well-manufactured stock, containing good widths and lengths, we can serve you.

DERMOTT LAND & LUMBER COMPANY

General Offices 1559 Railway Exchange Bldg. CHICAGO, ILL.

Band Mill and Yards—DERMOTT, Ark.

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Manufacturers and Wholesale Dealers

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HARDWOOD LUMBER

Walnut, Mahogany

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American Walnut Veneers

SPECIAL:

5 cars 5/4 1 & 2 Pl. Red Oak

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Strictly Soft Textured

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High Grades—Quick Shipments

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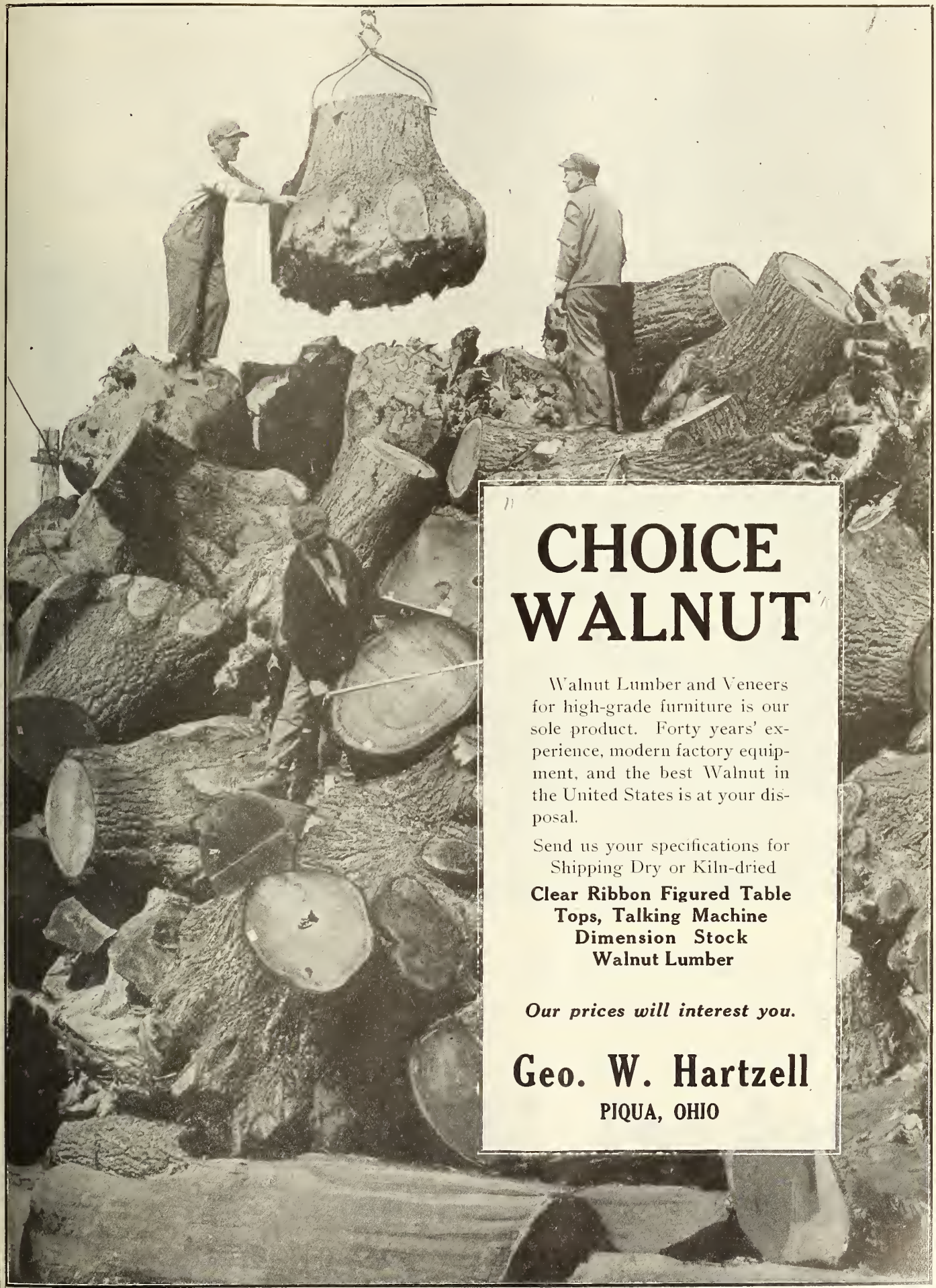
Mills: KNOXVILLE, TENN., WALLAND, TENN. FRANKLIN, ARRINGDALE and BUTTERWORTH, VA.



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Walnut Lumber and Veneers for high-grade furniture is our sole product. Forty years' experience, modern factory equipment, and the best Walnut in the United States is at your disposal.

Send us your specifications for Shipping Dry or Kiln-dried

Clear Ribbon Figured Table Tops, Talking Machine Dimension Stock Walnut Lumber

Our prices will interest you.

Geo. W. Hartzell

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of the

Large Black Walnut Tree

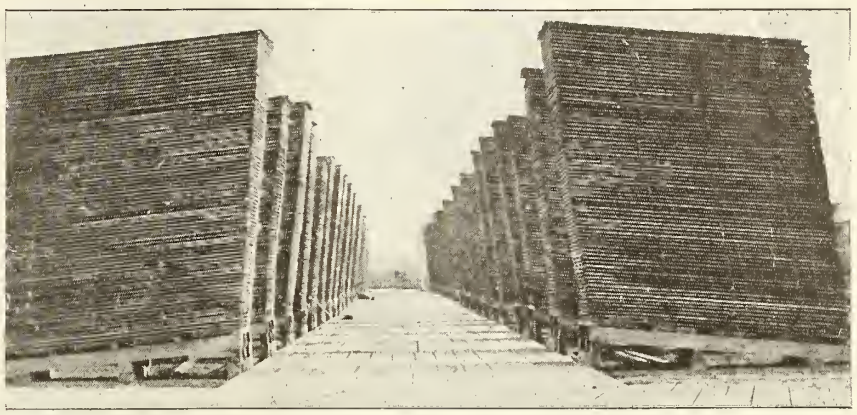
The first log contains 1369 feet, and is one of the few exceptionally fine specimens of American Black Walnut to be found in the Central States. This stump has extraordinary indications of figure, and the figure can also be seen extending far up into the log, which is a very valuable piece owing to its figure and wide clear cuttings.

Pickrel Walnut Co.

St. Louis, Mo.

EXCLUSIVELY WALNUT

Two Conclusive Proofs Why You Should Buy Your Lumber From Us



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"We have been using exclusively gum lumber, both sap and red, shipped by you for the last three years, and have been well pleased with its character, both as to grade and condition. The condition of same being an evidence of careful handling before shipping. We have been well pleased with the transactions which we have had with you, and will endeavor to continue using your stock as long as available."

We also manufacture Oak, Ash, Elm, and Cypress at Louise, Miss., mills. Get our prices before placing your orders and become a SATISFIED user of Gum or one of the other Southern hardwoods.

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We want your ORDERS for

CABINET WOODS:

Walnut
Mexican Mahogany
Quartered White Oak (fine figure)
Plain White Oak (soft texture)
Ash, Cherry, etc.

Our prices are right—have a complete stock—can ship immediately.

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Really Dry Hardwoods

M B

As evidence of the dryness of Martin-Barriss hardwoods we can refer you to many handsome interiors of elaborate detail.

Our process of drying requires three weeks during which time the heat and humidity of the kilns are kept at an efficient degree.

If our stock does not include the particular figure you want, we will gladly cut into new logs.

Have you our prices?

The Martin-Barriss Co.
Cleveland, Ohio

Have You Seen Our

Self-Balancing Cover Support

It is noiseless, the slightest touch moves the cover either up or down. Easily applied, and inexpensive.

SEND FOR SAMPLE.

Also of Tone Rods, Needle Cups, Needle Rests, Continuous Hinges

or

Furniture Hardware
in Period Designs

WE CAN MAKE DELIVERIES

Weber-Knapp Co.
Jamestown, N. Y.

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BOX and CRATING LUMBER

We are now sawing on Spruce and Hemlock Lumber.

LET US HAVE YOUR INQUIRIES.

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"Gum of Quality"

Yazoo River Red Gum

as produced by

Thomas & Proetz Lumber Company
3400 No. Hall St. St. Louis, Mo.

is carefully manufactured; soft in texture; dark, rich in color; and admirably suited for furniture and interior trim.

Mills—Belzoni, Miss.; Catchings, Miss.; Naples, La.

If you are not buying from us, write today.

Galbraith & Co., Ltd.
Owen Sound, Ont.

Manufacturers of

"Well-Made" Wood Specialties
Toys, Games, Turned Goods and Kitchenware

We Specialize on

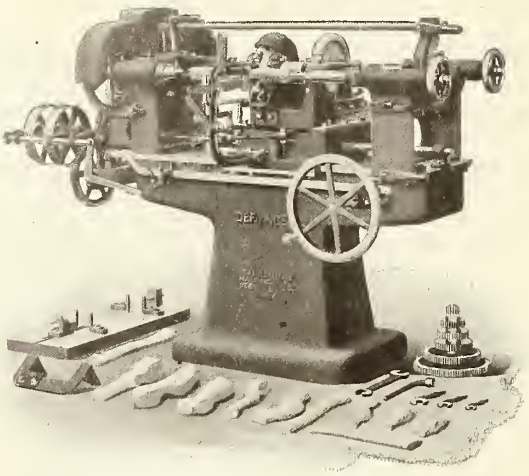
CUSTOMS TURNINGS

Your order will receive prompt attention

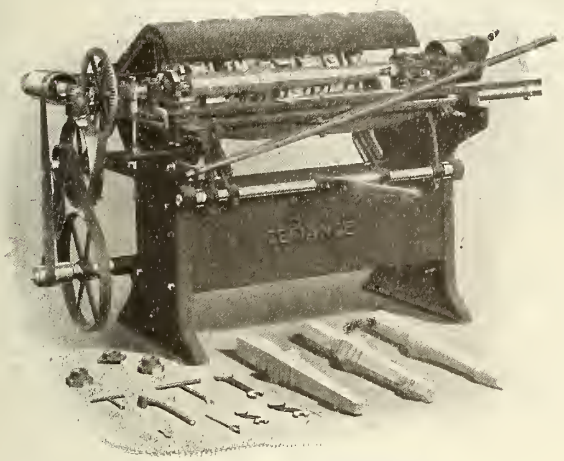
DEFIANCE

Automatic Lathes Yield Profits

Conditions in the manufacturing fields are apparently becoming more serious every day. Labor shortage, coupled with the astounding cost of raw materials, has made the use of high productive machinery more necessary than ever before. The use of high productive machinery will do much toward offsetting the labor shortage and increase the margin of profit as well.



18 in. Patent Automatic Copying Lathe



32 in. Variety Turning Lathe

AUTOMATIC COPYING LATHES

are built in various sizes and designs to do irregular turning of every description. Aeroplane struts and propellers, gun stocks, saddle trees and side bars, wooden soles and heels for shoes, golf stick heads, spokes, handles and brush backs are common products of our copying lathes.

VARIETY TURNING LATHES

are built in various sizes to turn, with a single set of cutter heads, rounds, squares, ovals, hexagons and octagons in straight and tapered work. It will turn table legs, balusters, baseball bats, croquet mallets, Indian clubs, dumb-bells, ten-pins, etc., etc., in a single operation.

We build over 500 designs in special woodworking machinery. Write for illustrated descriptive matter on your requirements to

The Defiance Machine Works

Defiance, Ohio, U.S.A.

New York City **London, Eng.**

HERE AGAIN

is the proof that we are not only PULLING FOR GOOD OLD

OAK

but also pulling *for those who SELL IT—*

THIS MEANS *YOU.*

Month by month we shall prove to the CONSUMER (*Your Customer*) that *OAK FURNITURE*—is due for a very heavy "COME-BACK."

Does your line meet the issue? If not, it can by next season.

ANOTHER OAK FURNITURE ADV. APPEARING IN THE BEST MAGAZINES IN AMERICA.

"Good OAK FURNITURE is more nearly 'boy-proof' than any other equally fine cabinet wood"

Its elegance, dignity and artistic adaptability are backed by its sturdy resistance to dents and scratches. (Really a quite important point.)

"There is no finer heirloom than good OAK furniture." There is no more *safe* and *enduring* investment—none better worth *insisting* upon.

AMERICAN OAK MFRS.' ASSN.,

LET US CONSULT TOGETHER FOR THE GOOD OF ALL CONCERNED. WRITE US. WE'LL ANSWER.

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E. H. Shreiner Lumber Company

EXCLUSIVELY WHOLESALE

Band Mill—West Salisbury, Pa.

General Offices—PITTSBURGH, Pa.

8 cars 4/4 No. 2 B. Poplar

SPECIAL

Watch this space each month for Specials.

The Union Box Company

Wooden Box Manufacturers

BALTIMORE, Md., U.S.A.,

Have For Sale

One No. 288 Linderman Jointer

in first-class condition, with extra sets of knives, etc., capable of taking eight foot material.

Also have **three 4-Hole Boring Machines,** such as used for boring holes in diaphragms for AMMUNITION BOXES.

Make us an offer for these machines, or write for further particulars.

"Furniture in England"

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Upwards of 400 exquisite half-tone and color plates on pages 14 ins. x 10 ins.

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Delivered to any address in Canada

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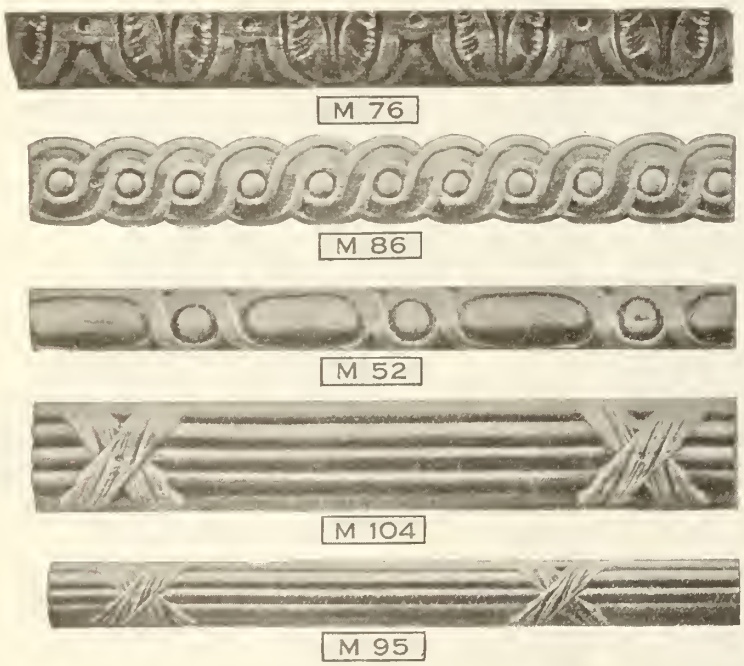
The Woodworker Publishing Co.

Limited

Toronto Ontario



Period Mouldings

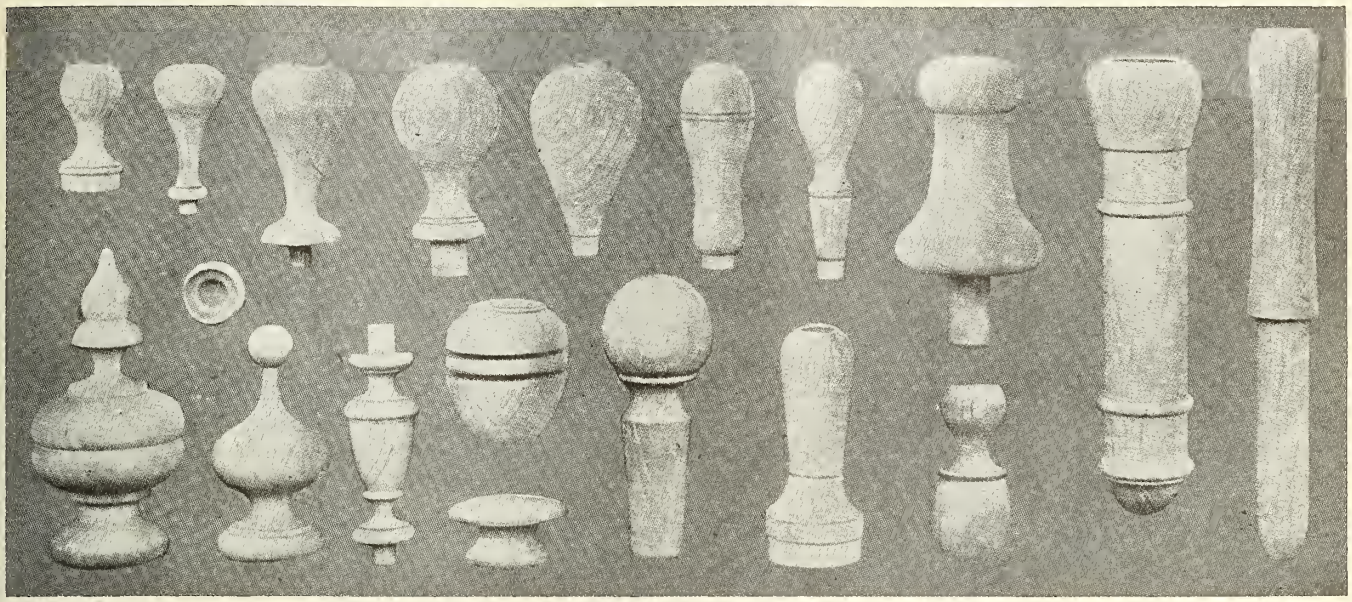
Real Wood—No Composition

We recently mailed out samples of a number of new patterns. If you did not receive a set, advise us and we will send by return mail.

WADDELL MANUFACTURING COMPANY

Coldbrook and Taylor, N. W.

GRAND RAPIDS, MICHIGAN, U.S.A.



Dowels and Wood Turnings

Those Smooth Dowels

The new dowel machine is a wonder for efficiency. The new process dowel made from it is round. Always round. There is nothing about the manufacturing process which could produce anything but a round dowel.

It is also always uniform in diameter and never varies more than a few thousandths of an inch from the measurements desired. The dowel is finished and polished with a clean cut lengthwise of the grain and not with a scraping cut crosswise of the grain, as in the old method.

These machines are adjustable to any size from 3/16 of an inch to one inch, making these changes as fine as to a 64th of an inch. Our smooth dowels are straight, round and perfect.

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We show above a few of the many shapes which we can turn out with our special automatic machinery.

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Dowels the Smooth Kind

Birch, Beech and Maple
Plain, per 1000 Pieces

Length	3-16 in.	1-4 in.	3-8 in.	1-2 in.	5-8 in.
12	$1.50	$1.50	$1.80	$2.20	$2.95
16	1.95	1.95	2.40	2.95	3.93
18	2.20	2.20	2.67	3.35	4.40
24	2.95	2.95	3.60	4.40	5.90
27	3.35	3.35	4.05	5.00	6.60
30	4.05	4.05	5.00	6.16	8.20
33	4.50	4.50	5.50	6.75	9.00
36	4.95	4.95	6.00	7.33	9.80
42	5.70	5.70	7.00	8.60	11.50
48	6.50	6.50	8.00	9.80	13.05
54	9.20	9.20	11.20	13.80	18.40
60	11.25	11.25	13.75	16.85	22.50
66	13.05	13.05	16.00	19.55	26.05
72	14.75	14.75	18.00	22.05	29.40
No. DOWELS TO BUNDLE	1000	500	200	200	100

Besides the above sizes, we make dowels up to 1 in. or any fraction thereof. In addition to the smooth kind we make the glue joint dowel in all sizes.

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Toy Products of Canada, Limited

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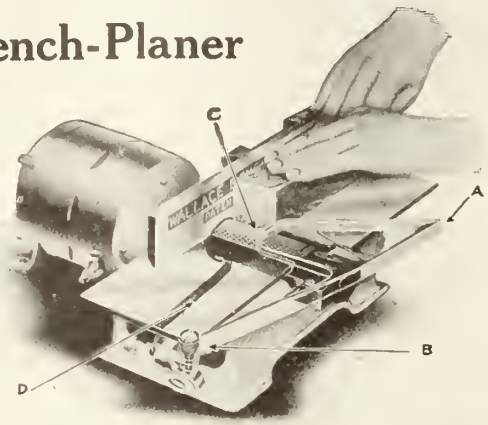

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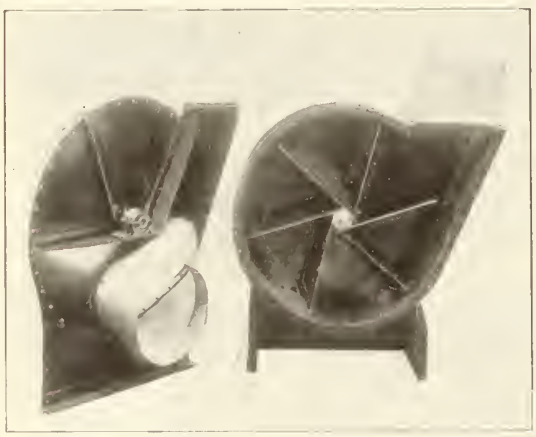
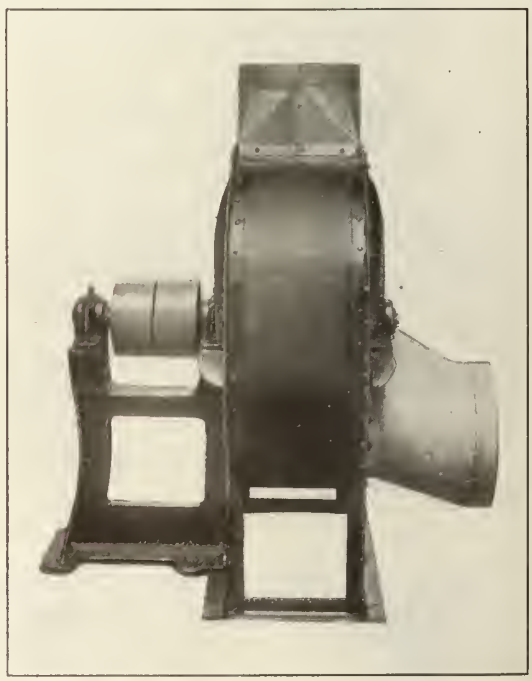


Side vew of 35-inch Blower, with front side removed, showing Fan Wheel in position.

The "FOSTER" FAN

(PATENTED)

An Efficient and Reliable Fan for your Blower System



Showing end view and S.K.F. bearings of 35-inch Blower and Exhauster, equipped with tight and loose special ball-bearing pulleys

The "FOSTER" FAN is the only non-centre suction fan in existence. Instead of a centre circular inlet, the "Foster" Fan has a segmental opening to the rear, immediately adjacent to the discharge duct. The Fan Wheel is so constructed that the material entering the fan is immediately discharged, without passing through or around the wheel. It handles every conceivable material, wet or dry, without clogging.

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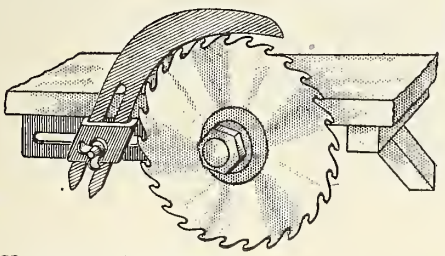

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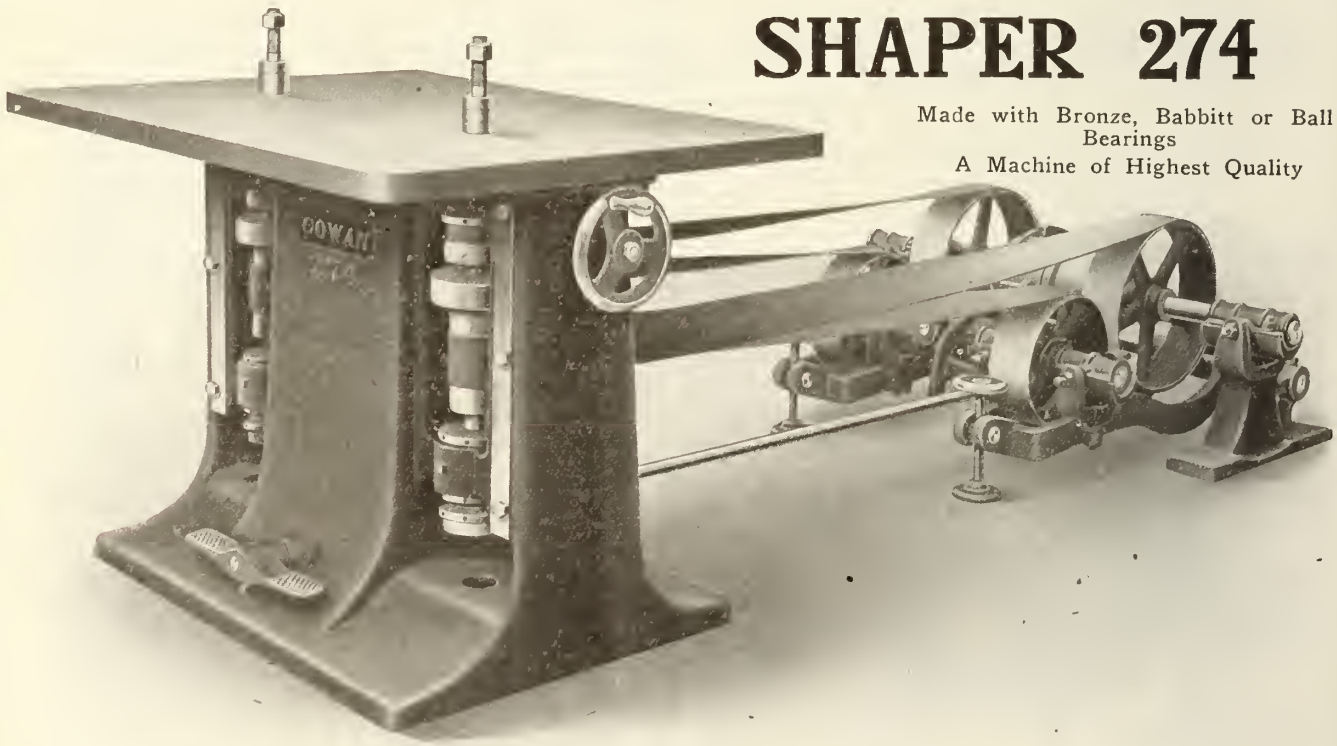

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A Monthly Publication in the Interest of the Woodworking Industry.
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Shell Box Prices

There is a great deal of dissatisfaction among manufacturers over the prices the Imperial Munitions Board is paying for shell boxes. Contracts are now being let for a large quantity of the Bethlehem type box, for which we understand the Munitions Board refuse to pay more than $1.45, while manufacturers agree that the box cannot be made at a profit for less than $1.55 or $1.60. Some firms say that even this is not enough, and that the price should be $1.68 or $1.70. Some manufacturers are more favorably situated in regard to the obtaining of the raw materials. As one firm puts it, they are located in close proximity to a point of lumber production and are able to purchase the output of numerous small mills at prices considerably below those prevailing in other parts of the country.

Be this as it may, the Munitions Board should, while calling for tenders, base their prices on the cost of produetion. They undoubtedly have men connected with their organization possessing some knowledge of manufacturing conditions who could lay down a price that would make the business profitable for those manufacturers who wish to participate in the business, but who cannot do so at the prices offered without the certainty of financial loss.

Patriotism is all right, but manufacturers who are harrassed by the continually rising costs of raw materials and the increased expenses of operating their plants cannot afford to be philanthropists. The Imperial Munitions Board should exclude from its purchasing department men who either cannot or will not realize that production costs are increasing. Such men are a detriment to the development of one of Canada's most important industries. The Imperial Munitions Board should be among the first to recognize existing conditions and adjust their prices accordingly.

Woodworkers are not asking unreasonable profits, as will be seen from letters appearing elsewhere in this issue. At the present time a great many of them will be satisfied if they can operate their factories and come out even. One firm states that they would be willing to accept a profit of 3 per cent., the Munitions Board to pay for the raw materials and appoint an accountant to audit the books.

Another evil which contributes to the worries of the manufacturer of shell boxes is the way the Munitions Board orders deliveries to be stopped periodically. Just about the time the operations have been nicely organized and there is a chance of cutting down the costs of production an order is received to hold up deliveries. This means the manufacturer practically has to close down his plant, as it is next to impossible to switch over on to other work without disorganizing the entire plant.

Whatever the outcome of the shell box business, there is no doubt that manufacturers have so far received very little consideration from the Munitions Board. Dissatisfaction certainly exists, and we believe with reason.

Development of Talking Machine Industry

One of the features of the woodworking industry in Canada during the past year or so has been the development of the talking machine industry. These machines are now being made in a wide variety of sizes and styles, and are apparently finding a ready market. The manufacture of the cabinets involves a high grade of cabinet work, most of them being of three and five-ply built-up stock, finished so as to present an attractive appearance.

A number of the companies, instead of making their own cabinets, have them made by outside firms. One furniture company in Toronto is making cabinets for three different manufacturers of talking machines. In order to make the manufacture of these cabinets a profitable venture the superintendent in charge of the plant must be a very alert mechanic, with an eye for costs. There are a number of small parts required for each cabinet, and unless a thoroughly practical divi-

sion of the work is planned, the manufacturer may find himself working at a loss.

Stock cutting and veneering are probably the two biggest factors, but when these departments have been arranged and equipped to handle the necessary amount of stock, it is essential to have a well-balanced organization in the cabinet room. A good plan should be to make a note of the various operations and distribute them among the workmen, so as to keep the work moving. By specializing on one or two operations the workmen would become expert on their particular work. In this way they could turn out a great deal more work than if they had to do several operations requiring different tools. It is the small and tedious operations that require expert management. Cutting up the stock is simply a matter of handling large quantities of raw material, and where modern facilities are used this does not present any serious difficulties.

To turn out large quanties of veneered work economically requires good equipment and a good organization. Where the quantity of work warrants it, jointing, taping, and cutting machines can be used to good advantage. They are efficient, and where they are used much less space is required for the veneering operations.

The various types of talking machine cabinets are more or less standardized, and thus afford greater opportunities for an efficient arrangement of machines than is possible where a varied line of furniture is manufactured.

Starting the Cost System

The importance of having a cost system is pretty well recognized by manufacturers. But an efficiency expert informed the writer the other day that a great many factories have cost systems that are not at all adequate. He stated that during the course of a discussion with a prominent furniture manufacturer recently, he offered to bet the furniture man that some of his goods were costing him considerably more than his cost records showed. The efficiency man claims that the majority of manufacturers fall down on allocating their "overhead."

A manager with whom the writer discussed accounting and cost finding problems said: "I fully agree with the trade journals about keeping records, depreciation accounts and all that, but taking the one item of depreciation alone, where am I going to start to take care of it? If I was starting out with a new plant it would be an easy matter, but how am I to know how much this building and equipment has depreciated already?" He was advised to have an appraisal made of his plant by a reliable appraisal company. This would give him a starting point for his accounting system.

We wonder how many manufacturers are in the same position as this man. Perhaps quite a few. Their factory buildings have probably not been all erected at the one time and they are at a loss to know at how much to value them. This is a matter that is very easily gotten over. A good plan is to have an appraisal made of the plant every five or ten years.

Apart from the function it serves as a basis for an accurate accounting system, an appraisal is valuable when applying to your banker for a loan. He has before him an independent verdict and is not called on to take your word about the value of your assets. While speaking about appraisals; they are also a very handy thing to have when adjusting the loss caused by fire.

In regard to an adequate cost system, no definite rules can be laid down. A study should be made of the products being manufactured and then the principles of modern cost finding applied.

With a good cost system in operation, and depreciation, etc., provided for, a statement giving the main facts would be sufficient to assure a banker that the business was being conducted properly and efficiently.

Shell Box Inspection

Editor Canadian Woodworker: The government is not likely to increase their revenue much from the special profit tax on the shell box manufacturers. The man who can clean up 10 per cent. under present conditions must be exceptionally situated. Prices of all materials are constantly soaring, and one never can tell what the next twenty-four hours may bring forth.

The labor situation is also becoming more difficult every day, so the Munitions Board must now face the necessity for paying higher prices for boxes.

One of the most annoying features of the shell box industry is the character of the inspection, and I have sometimes wondered if practical men are intentionally barred from becoming inspectors.

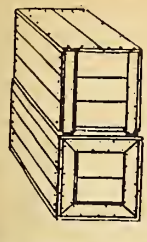
Quebec Manufacturer.

Can Not Get Contracts

Editor Canadian Woodworker: I made ten thousand 4.5 boxes for the "Bertram" shell committee, but since that time have not succeeded in landing a contract, and do not know the reason, as the boxes I made were perfect, not one being condemned.

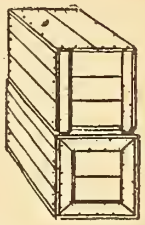
I figured on a great many different kinds of shell boxes along with the one I made before, and for which I got 80c. In figuring again I put the price at 60c. All the satisfaction I got from the committee was that my proposition was not sufficiently attractive. I did not know what they meant by that, so I wrote and asked them if they would tell me if my price was too high and by how much, and I would try to meet the price, but could not get any satisfaction.—Subscriber.

With the present scarcity and high price of leather the rubber belt has become very popular, and it is safe to say that it is fully justifying the claims made by the various rubber manufacturers.



BOX MANUFACTURING

Shell Box Prices—Cost Finding—Individual Exhausters—Special Machines



Cost Accounting in Box Industry

By F. C. W.

An effective and simple method of obtaining the necessary data relative to the cost of boxes which is being used by one of the largest Canadian manufacturers of shell boxes, and which is equally suitable in principle for a small manufacturer, is here outlined.

We will start with the estimated cost, which should be divided into: Lumber, sundries, labor, overhead, profit.

Lumber and sundries should be priced at cost, laid down at plant.

Labor is here used as covering only the time of all workmen and foremen actually engaged on the boxes.

Overhead includes plant depreciation, machinery repairs, renewals, and administration expenses.

Profit: Actual net only.

Now open an account in the cost ledger, titled "War Orders," or some other designation, subdivided under headings: Lumber, sundries, labor, overhead, shipments.

All purchases intended for use in the construction of the box will be entered under either of the first two headings, freight and cartage being entered under the heading covering the goods to which they apply.

The box pay roll is sufficiently large to warrant dividing the regular pay roll, so that all box time is ntered in one section, thus permitting of one entry weekly direct from pay roll to cost ledger, under the heading "labor," of actual wages paid.

Overhead entries will include those already enumerated in this article.

Shipments should contain a record of boxes or parts shipped, which in the first instance should be valued in accordance with the estimated cost. This cost should be balanced monthly. The outstanding debit balance under the first two headings should represent the actual value of material on hand, the correctness of which can only be ascertained by taking stock. This should be done in the beginning of the contract every month, till real cost is obtained, and thereafter not less than every six months, as it is only by constant vigilance that waste even in such items as bolts or felt pads can be reduced to a minimum and so maintained. Even labor will be found to vary considerably from week to week, and it is a good plan to watch the cost accordingly.

By this method of accounting the actual cost from month to month can be ascertained and any undue increase immediately detected. In fact, this system is applicable to every job, whether it be for one million dollars or one dollar, with the difference that a small job would have labor entered from a daily time card and valued at the average hourly rate paid, and would not require to show the individual overhead, which should be charged to account so marked.

By applying this system to your entire plant, whether small or large, you have a monthly record of actual profit or loss. Of course, this will necessitate keeping a progressive record of stock on hand, which it is advisable to check semi-annually. Such records are easily kept by having a stock account for each department or class of merchandise, against which all purchases or materials returned from a job are debited, and all material used (which should be issued by requisition only) is credited.

An Inspector of Production

In the box industry, particularly the manufacture of shell boxes, it is of the utmost importance to watch closely for waste and opportunities to prevent variation and increase in the cost of production. As a rule, profits on war orders are figured very closely, and it follows that a profit may be easily converted into a loss unless cost is carefully watched. It is the numerous small leakages that count. Speaking to a representative of the "Canadian Woodworker," the superintendent of a very large box-making plant told of the good results which followed the engagement of an independent inspector, whose sole duty is to watch production. It was noticed that the cost of production per box varied considerably over a given period. Some of the causes for this were apparent and unavoidable, but others were not traceable, and it was with a view to stop these leakages that the inspector was engaged. His duty is to watch the various operations and to report to the superintendent such causes as he thinks are hindering economical and rapid output. He also hands to the foreman a duplicate of the report, in order that concerted action may be taken at once to remedy conditions. He has no jurisdiction over the men except in the absence of the foreman.

The reasons for some of the variations in production were quickly discovered. One of the most essential things in a box factory is that the process of manufacture be continuous—that there be no interruptions in operations that will result in the tying up of departments dependent upon the flow of partly-manufactured lumber or boxes from other machines. It was found, in one instance, that the man working one of the machines sometimes laid off for about an hour to fix a portion of the machine. This involved the loss of time in other departments, as it meant that the supply of boxes to other men was curtailed, causing a loss in output, and consequently higher average cost per box. In another instance the loading of lumber from the ground floor was interrupted, causing loss of time to those who were relying on a continuous supply of the raw material.

The inspector found many small sources of waste of time and material, and as he is jointly interested with the men in the earning of a bonus, there is an incentive which makes for the utmost vigilance. The results have amply justified this system of inspection, as the output is now more uniform and the costs also lower.

Cost of the Bethlehem Shell Box

Leading Manufacturers Agree that It Should Not Be Made for Less than $1.60—One or Two Think It Can Be Made for a Little Less

The "Canadian Woodworker" recently wrote the manufacturers of shell boxes as follows:

Dear Sirs,—We give below what is regarded as an accurate detailed account of the cost of manufacturing the Bethlehem shell box. You will note that this is $1.45 2/3c. If 10 per cent. is added to this for profit—and we certainly believe manufacturers are entitled to at least 10 per cent. profit—it would make the selling price of this box $1.60¼.

Itemized Cost

1.08 ft. net spruce, plus 20 per cent. waste, equals 13 ft., at $35 per M., equals	.445
Three three-ply diaphragms at .09	.275
Rod, plate, nut, and chain	.285
Nails and screws	.045
Wire and staples	.035
Felt	.035
Glue	.013
Labor, including power, millwright, foreman, etc.	.20
Overhead, including interest, repairs, compensation, insurance, shipping, delays in manufacture, storage, demurrage and incidentals not less than	.125
	1.458
10 per cent. profit	.145
	1.603

We believe $1.60 is the very least that manufacturers should accept orders at. What do you think? We would like very much to have your opinion. Do you think $1.60 is a reasonable price, or should manufacturers put on a larger profit than 10 per cent.? Please discuss the manufacturing of the Bethlehem box at any length you wish.

Yours very truly,
Woodworker Publishing Company, Limited.

The replies to this letter, some of which are published here, indicate that practically all manufacturers of the Bethlehem box are of the opinion that the price of this box should be pretty close to $1.60. What is the reader's opinion?

* * *

Answer No. 1

We have examined this statement carefully, and find difficulty in taking exception to any of the figures. It has occurred to us, however, that 60 per cent. factory expense is not entirely adequate under conditions as we find them in 1917. This percentage did quite properly apply to 1916, but with unsettled conditions as we find them to-day, to be on the safe side we would say that 70 per cent. or 75 per cent. would be more nearly correct. However, we presume that it is your desire to be, if anything, low, and in this we believe that you are acting in good judgment.

The 10 per cent. that has been laid down to profit, we believe, in considering that it is war time and that no more than living profit should be expected, is very satisfactory, although with a commodity of this kind, where the continuance of its sale is so uncertain and both your equipment and the stock on hand being probably lost for whatever proportion is left over, we are inclined to believe that 20 per cent. profit should not be considered excessive. These are the only suggestions that we have to offer, and believe that, on the whole, your statement has been very accurately compiled.

No. 2.—It is difficult to figure an exact cost of this box from month to month without getting new quotations of all the material that goes into the box, as for the past year all material has advanced every month, some to a greater percentage than others. We have gone over your figures very carefully and find that you are very close to what the box should be sold for at the present time. Our quotation on this box to the government in April last was $1.55, and if we were quoting to day it would be around $1.65 per box.

The great difficulty with the manufacturers of this box, or any other commodity, is arriving at an overhead, and this is where most of us fall down. It is no trouble to get at the cost of the material in an article, but the difficulty with the shell boxes is the output. One month you are rushed to death and another month are tied up. If, when orders were placed, you had a fixed number to ship regularly every month until your order was completed, there would not be so much difficulty in arriving at a fair price. We all know, or should know, what our overhead per day is, and if we had a steady output of so many boxes per day during the term of our contract it would be an easy matter to fix the overhead at so much per box. In our experience, however, this could not be done, as we were rushed one month and held up the next. Consequently, our output was unsettled, and we had difficulty in establishing a fixed overhead, as, when we were held up, our regular business, which had been sidetracked for shell boxes, could not be taken up advantageously to cover our overhead. Therefore, any manufacturer of shell boxes is not safe without a good, fair overhead charge.

If there is any item we think is rather low in your statement of the cost of this box it is the overhead. You have added 12½c per box for overhead, which should include power. This, we think, should be from 17½c to 20c per box. As an example, take a plant turning out 400 boxes per day at 12½c per box for overhead. This would mean $50, which we consider too small an item for overhead for all the items you have mentioned and also power and management. The labor, including foreman, factory, and government inspection, is on the low side. To-day your price of $35 for good quality of spruce, such as specifications call for this box, is a low one. We think the 10 per cent. profit on the total as you have it is sufficient.

* * *

No. 3.—We have made quite a quantity of these boxes and are just finishing a contract. We have declined orders twice recently, as the Imperial Munitions Board refused to advance the price above $1.35, though they came to us twice to take the orders. We asked $1.75 each.

We have used white pine exclusively—no spruce. We arrived at $1.75 as follows:

14 ft. pine at $40	.56
Diaphragms	.285
Hardware	.36
Felt	.035
Direct labor	.15
Indirect labor	.0
	1.44
Overhead	.145
Profit	.165
	1.75

We think the manufacturer of munitions should be satis-

fied with less than 10 per cent. profit; we would be, but the fluctuations in cost—labor uncertainties especially are so great—that the manufacturer, in our opinion, cannot be sure of any profit if he figures on less than 10 per cent. when entering a contract. Should the Imperial Munitions Board be willing, we would contract for boxes as largely as our capacity would permit at a net profit of, say, 3 per cent., the Imperial Munitions Board to stand the fluctuations in cost. This would, we believe, be the best method for the manufacturer, and the best also for the country. Efficient accounting and auditing would, of course, be essential. We shall be interested to see the opinions of others.

* * *

No. 4.—While the figures in detail do not agree with our own exactly, the gross result is approximately the same. We think that manufacturers ought to be willing to make these boxes for a 10 per cent. profit, and we figure out, under the present basis of costs for material and labor, that this box could be produced for $1.55, including the 10 per cent. profit.

* * *

No. 5.—With reference to cost of Bethlehem box, consider $1.60 a very fair price for a small manufacturer, but think a large manufacturer, with complete equipment, would do several cents better.

* * *

No. 6.—According to our way of figuring this particular box, you have figured correctly, and, in our opinion, this box should not be made for less than $1.60, as 10 per cent. is not too much to be added as a profit.

* * *

No. 7.—The lumber to be purchased now would cost about $35 per M. as you have it, but diaphragms can be purchased at 6¼ cents, while you have them at 9 cents—in fact, all your supplies are high, with the exception of glue. You have the labor at the same figure we make it, but we make the overhead charges .121, while you make them .125. We also add 3½ cents per box for special machinery figured to cover 60,000 boxes. This will, of course, vary, according to quantity of boxes made, but you have evidently not taken this into consideration at all. At the present cost of supplies we think a price of $1.55 would yield 10 per cent. profit, with which any manufacturer should be satisfied.

* * *

No. 8.—We believe your price is about correct, only we have been saving much on lumber and diaphragms so far, as we have secured our lumber very much cheaper. That's the only two items, we think, we have been saving on. The item of .20 cents for labor, etc., we believe is rather small. We figured on .25 cents, but the other way for overhead expenses we figured only on .10 cents.

We believe, however, that the price of $1.60 is not too much, although we have been making them so far at $1.35, and it left us a fair profit, as we had purchased our lumber very, very cheap last year, and we have still enough to last us until September. It will cost us this year about $30—no more, and probably below. We know for a fact that many small firms are getting very low prices. They don't know their business, and they are the people who prevent others from getting better prices.

We made a tender about two months ago at $1.50, but the price was too high, and it is more than likely that they will not pay more than $1.50, if they do, for the next lot.

* * *

No. 9.—We were very much pleased to receive your letter of the 23rd, giving us a detailed account of the cost of manufacturing the Bethlehem shell box.

We have gone into your itemized cost and, after studying same carefully, we believe the cost set forth in your letter is about correct. There is no doubt in our minds that $1.60 is the least that manufacturers should take orders at for this box, but the trouble arises, as we have found it in the past, that the small manufacturer is to blame for the low price set on shell boxes by the Imperial Munitions Board. This is the fellow who has not much other work on hand, and when he is asked for a price on a shell box he does not take the time to go into the cost of the box which he is asked to quote on, and, besides, when figuring never takes into consideration the item of overhead, which the large manufacturers do and have to consider, consequently his price is the lowest, and other manufacturers who want business have to take it at this price or do without an order.

Many of the large manufacturers are placed in a peculiar position. That is, that our general trade—which is sash, doors, blinds, lumber, etc.— is very quiet, and therefore we have to look for some other line to keep our factory up to capacity. Mind you, if the general building trade was good, we would not be bothered making shell boxes at the ridiculously low price at which they are being made to-day.

Getting back to the Bethlehem box, we have just been lately asked to quote on 25,000 of these boxes, and we quoted $1.60, same price as you figure in your letter, but we are very much afraid that we will not receive same at this price, as we have heard that several other firms have already quoted $1.50. In all our dealings with the Imperial Munitions Board we have never yet received an order at the price we have quoted. It has always been offered to us from 10c to 20c less per box.

* * *

No. 10.—We do not manufacture this box, and it is not likely that we will be manufacturing it, so we are not in a position to give any information.

We are manufacturing the two round 6-in. mark III. box, and if your paper decides to publish anything on this or give out any figures as you have on the Bethlehem box, we would be glad to hear from you. We think the idea is a good one, and it is quite evident that a lot of manufacturers are making these boxes at too low a price, not knowing just what their exact cost is. Information such as you are sending out should be very useful to them.

* * *

No. 11.—We think your figures are correct. In regard to your query as to whether manufacturers should put on 10 per cent. or more, our experience has been, after two years, that a manufacturer is fortunate if he can get 10 per cent. profit. The great difficulty we have to contend with is that people with little or no knowledge send in figures for boxes and then come to grief. This would be all right if the punishment was confined to them, but the evil is that they establish a low figure so that responsible parties who can properly estimate and who have the equipment cannot obtain even 10 per cent.

This applies to all kinds of boxes. For example, we received 95 cents per box under the old shell committee for six-round boxes. When the present Imperial Munitions Board came into existence we only received 65 cents, which was not sufficient. We lost on that contract, and yet we cannot blame the Munitions Board for only paying 65 cents, as they had still lower figures. Anything you can do to enlighten the Munitions Board in establishing figures will be a blessing to those who want to do honest work and are content with a profit of 10 per cent.

* * *

No. 12.—We have checked the figures as set out in your estimate and, under present conditions, we think a price of $1.60 is only a fair and reasonable one for Ontario manufacturers at least.

* * *

No. 13.—I went over your figures, and I find that you have them as nearly correct as it is possible to make them,

with the exception of the glue, which is high by 3 cents. However, anyone that takes an order for less than $1.65 each will not make his own. The price should not be any less than $1.68 each. This is what two or three manufacturers asked the Munitions Board.

* * *

No. 14.—The Imperial Munitions Board are now placing orders for Bethlehem boxes at $1.45. They will not go any higher, and many manufacturers have accepted this price, and we are one of them. We purchased our lumber about $10 per thousand feet cheaper than it can be purchased in the West, as we are right amongst the small mills and can buy much cheaper from them. We are in a position to make as much profit at the price we have accepted as the Western people at $1.60. We have already secured all the lumber for our requirements.

Lumber and Hardware Used for Shell Boxes

Figures Submitted by Manufacturers Give an Idea of the Quantities of Raw Materials Consumed in This Industry

The number of Canadian firms that have manufactured munition boxes since the beginning of the war is approximately 170. Some of these have now quit making them and gone back to their regular lines, but in the majority of cases other manufacturers have stepped in and taken their place, so that the shell box business is still a big factor in the woodworking industry. We believe the following figures will be interesting to our readers. They have been received from shell box manufacturers, and convey some idea of the quantities of raw materials used in this industry. Each number indicates a separate communication:

* * *

Answers

No. 1.—We have manufactured approximately 75,000 Bethlehem boxes. The approximate quantity of lumber used amounts to 1,000,000 feet; hardware used amounts to $26,250.

* * *

No. 2.—In 1914 our consumption of lumber for shell boxes was approximately 250,000 ft. and in 1915 it was 750,000 ft. During 1916 we used slightly over one and a half million feet of spruce and pine lumber, practically all for the Bethlehem boxes, and we anticipate using about the same quantity this year.

In the matter of hardware, during the same period our consumption would be about $12,000 annually.

* * *

No. 3.—Since we have been making shell boxes we have used about 1,500,000 feet of lumber.

* * *

No. 4.—We have manufactured 535,000 boxes and 300,000 shooks, in the manufacture of which we have used ten million feet of softwood, one million feet of hardwood, two million, one hundred feet of veneer, thirty million nails ranging in size from 1 in. to 2½ in., and eight million screws ranging in size from 5/8 in. to 1½ in.

* * *

No. 5.—We can give you an idea as to the quantity of lumber used for shell boxes; also an estimate of the cost of the hardware. These two items include what it will take for our present contracts. Lumber estimated at 3,000,000 feet; hardware, $60,000.

* * *

No. 6.—We have not made any shell boxes for over a year, but while we were at them we used approximately 300,000 feet of lumber and $2,000 worth of hardware.

* * *

No. 7.—We had an order for 10,000 18 pr. six-round shell boxes in the winter of 1915-1916. We used on this order about 70,000 feet of spruce lumber and approximately 25,000 feet of hardwood.

* * *

No. 8.—We had a contract for 10,000 4.5 boxes about eighteen months ago. We also assisted another firm to get out certain parts for some boxes which they were making. A rough estimate of the amount of birch, pine, and spruce used by us would be 60,000 feet.

* * *

No. 9.—Estimating roughly, we think we have used the following amount of lumber in making boxes: Year 1915, 2,000,000 feet; 1916, 5,000,000 feet; 1917, 1,500,000 feet. About 25 per cent. of the above was hardwood. We think the prices that are now being paid for boxes are too low.

* * *

No. 10.—We will be through with our present contract of boxes within the next four or six weeks, and will have used one and a half million feet of lumber for war boxes.

* * *

No. 11.—In the manufacturing of shell boxes we used about 120,000 feet of lumber. The hardware and handles cost us about $3,000.

* * *

No. 12.—We have made 100,000 shell boxes of the Bethlehem type. In the manufacture of these we have used in the neighborhood of 1,250,000 feet of spruce and hardwood lumber. With reference to the quantities of hardware required, we might say that for 100,000 boxes we required 3,000 gross of screws, 50,000 pounds of wire nails, 25,000 pounds of twisted wire, 8,000 pounds of staples, as well as 100,000 rods made specially for these boxes.

* * *

No. 13.—We used about 500,000 feet of lumber of all kinds in connection with the shell boxes we turned out about a year ago.

* * *

No. 14.—We have used about three million feet of lumber in the manufacture of shell boxes.

* * *

No. 15.—In 1915 we made 25,000 shell boxes, and estimate we used 250,000 feet of softwood and 45,000 feet of hardwood in the manufacture of same.

* * *

No. 16.—Our firm has no contract at present for manufacturing shell boxes, but during last spring and summer we made 57,000 boxes, which required 575,000 feet of lumber and $11,000 worth of supplies.

If we were to write an article on the subject of shell boxes it would not be for the welfare of the Imperial Munitions Board.

* * *

No. 17.—We have done comparatively little in the way of shell box making, having received but one order. This was for 10,000 boxes, which we completed during the winter of 1915-1916. In this order we used about 150,000 feet of lumber and hardware (including rope handles) to the value of approximately $2,400.

* * *

No. 18.—We put through 25,000 shell boxes, 4.5 H.E. plugged, mark VL. The lumber we used in them was: Pine, 19,500 ft.; spruce, 254,800 ft.; birch, 48,100 ft. The rope han-

dles we got at 9 cents per pair and bands at 4½ cents per pair.

No. 19.—We used about 1,700,000 feet of spruce, 400,000 feet of ¼ in. veneer, and 350,000 feet of birch. Our hardware cost us $41,300. Besides above we made parts for shell boxes for others, taking about 300,000 feet of birch.

* * *

No. 20.—We have manufactured very few munition boxes. Our delivery is only 650 a day, which means that we are using about 10,000 feet of lumber every day. The hardware that we have been using up to now amounts to $34,000.

* * *

No. 21.—We have used approximately 900,000 feet of lumber and $25,000 worth of hardware in shell boxes which we have made.

* * *

No. 22.—We have made 80,000 shell boxes for the Imperial Munitions Board, and have used approximately 1,375,000 square feet of lumber, 21,600 gross of srews, and, say, 80,000 pairs of steel bands.

* * *

No. 23.—We have only been making shell boxes since the first of January, this year, and have had no large contracts. We have used for Bethlehem boxes about 750,000 feet of lumber—for 8-in. boxes 550,000 feet and for 4.5-in. boxes about 60,000 feet. Our hardware cost us approximately $25,000.

* * *

No. 24.—We handled our order for 7,500 boxes for 2-4.5 inch shells. Materials used were as follows: Birch, 10,000 ft.; spruce, 40,000 ft.; rope handles, 15,000; ¾ x 14 screws, 105,000; 1¼ x 14 screws, 75,000. 1¾ x 14 screws, 45,000.

* * *

No. 25.—We are in the shell box business, and following is approximately the amount of material we have used: Lumber, 790,000 ft.; screws, 20,000 gr.; nails, 12,000 pounds; steel bands, 80,000 pairs; steel corners, 40,000; rope handles, 80,000 pairs.

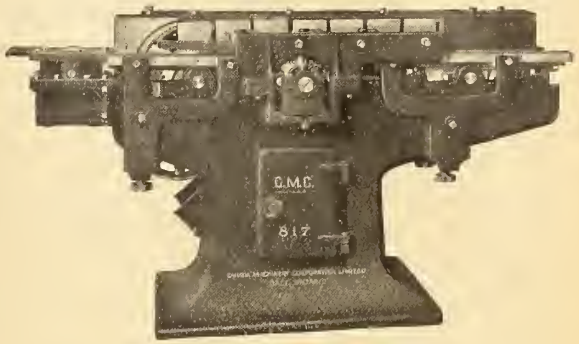
Box Board Matcher

The Canada Machinery Corporation, of Galt, Ont., are finding a large sale for their continuous feed box board matcher, which is designed to promote efficiency in making glue joints on box stock. The machine is strong and compact and the working parts readily accessible, thus permitting adjustments to be quickly made. The operator, when feeding in stock, can reach both tables without changing his position from the working side of the machine.

The makers of the machine state that short pieces can be jointed as readily as long boards, and that thin material will work as perfectly as thick stock. Stock from ⅜ in. thick and from 1 in. to any width can be worked. The rate of feed is in accordance with the speed of the operator.

The tables are 20 in. and 32 in. long, and have a vertical adjustment in parallel planes of 3 in. by means of hand-wheels, which are shown on the cut. The spindle is of cast steel, runs in long, self-oiling bearings, and is fitted with Shimer cutter heads. The feed works consist of the Canada Machinery Corporation's own design endless chain, with provision for taking up wear. The sides of the feed chain form guides or fences for the boards, without the need of any setting up or adjusting. The idler rolls, which hold the boards to the chain, are self-adjusting to the work, to which they are held by spring pressure, which can be varied or instantly released. The countershaft has tight and loose pulleys 12 in. by 5½ in., and should run at 750 r.p.m. The standard equipment comprises one pair of Shimer heads and bits and necessary wrenches.

The company advise us that they can furnish with this machine, at a slight additional cost, an attachment



No. 817 box board matcher.

for glueing the edges of boards after they have been tongued and grooved, as they pass out of the machine, without rehandling.

The machine is very suitable, not only for ordinary box work, but also for making ammunition boxes.

A Novel Belt Sander

The home-made belt sanding machine shown in the accompanying illustration was found in a factory which specializes in the manufacture of toys and novelties. The machine is a vertical one, and two men can

Home-made belt sander.

work at it at the same time, one on each side. A frame or box constructed to fit inside of the belt provides a flat surface for the belt to pass over. Thus small flat stock can be sanded readily. When it is desired to have something on which to rest the stock being sanded a small shelf with brackets is hooked on to the frame. By looking closely at the illustration the reader will see the screw which is used for tightening or loosening the belt.

Some Details of Munition Box Costs

Figures Showing the Cost of Making 4.5 inch Howitzer and 4 rd. 18 pr. Fixed Ammunition Boxes

June 21st, 1917.

Editor Canadian Woodworker:

Dear Sir.—We have received contracts from the Imperial Munitions Board for 87,835 shell boxes of various types, and in their manufacture we have used 943,000 feet of pine and 265,000 feet of birch.

We enclose one or two statements of cost, which crystallizes our actual experience in the manufacture of these boxes. You will realize, of course, that costs are rising very rapidly, and the figures shown in these statements would not apply to our present contracts. On the other hand we are receiving a higher price from the Imperial Munitions Board.

You will notice from our statements that in no case have we made extravagant profits. In one or two cases indeed, we have made almost no profit. In part, however, the reason for this is our own inexperience and mistakes. Speaking generally we should say that the manufacturer can make a fair return on his money and as much as he should look for from this particular business. To do this, however, he must have efficiency in all departments.

Order No. 8467

January 2nd, 1917, 10,000 3 Rd. Transportation Boxes for 4.5 in. Howitzer H.E. Shells. Price 88c per box delivered.

10,000 Boxes at 88c per box $8,800.00

Material

100,070 ft. soft wood	$2,345.95	
17,869 ft. hard wood	778.60	
10,080 rope handles	838.14	
10,000 pairs iron bands	895.00	
Bright Wood Screws	997.85	
Nails	169.95	
		$6,025.49
Shop wages		1,643.94
Administration wages		156.25
Office wages		57.92
Freight		129.43
Power		152.94
Plant and machinery rent (two-thirds of 6% on $37,643 for 2½ months)..		313.68
Machine repairs		45.29
Insurance		95.50
Taxes		4.17
Telegrams		4.17
Sundry		2.10
Profit		153.13
		$8,800.00

Cost Statement

Box cost	86.468	
Profit	1.532	88c
Percentage of profit on selling price. ...		1.74
Softwood used per box	Ft.	10.007
Hardwood used per box	Ft.	1.787
Percentage of waste, soft wood		11.07
Percentage of waste, hardwood		8.30

Cost Per Box on Material, Labor, Etc.

	Cents
Softwood	23.459
Hardwood	7.786
Screws	9.978
Nails	1.699
Handles	8.381
Bands	8.950
Total material	60.254
Freight	1.294
Birch cut to pattern, per M.	$45.00
Pine cut to pattern, per M.	24.00
	Cents
Shop wages	16.439
Office wages	.579
Administration wages	1.562
Total wages	18.580
Plant and machinery	3.136
Insurance	.955
Power	1.529
Machine repairs	.452
Taxes	.201
Telegrams	.041
Sundry	.021
Total overhead	6.335

Specification

1¾ in. screws in each box		10
1½ in. screws in each box		10
1¼ in. screws in each box		2
¾ in. screws in each box		14
Nails in each box		70
Pine per box	Ft.	9
Birch per box	Ft.	1½

Order No. 5173

June 19th, 1916. 25,000 4 Rd. Transportation Boxes for 18 Pr. Fixed Ammunition. Price $1.26 per box delivered.

25,000 boxes at $1.26 per box $31,500.00

Material

329,363 ft. soft wood	$7,314.99		
9,500 ft. less	229.50		
319,863	7,025.49		
Less disc. and frt. allowance	115.07		
		$6,970.42	
156,806 ft. hardwood	5,357.11		
10,500 ft. less	437.68		
146,306		4,919.43	
Bright wood screws		2,558.11	
Nails		65.54	
Wire rope handles (25,928 pairs)			3,293.48
Iron bands (25,000 pairs)..			640.00
Glue		131.05	
Sundry		33.50	
			$18,611.53
Shop wages			7,039.57

Office wages	300.18
Freight	1,475.41
Power	417.19
Depreciation of special machinery	299.34
Machine repairs	233.60
Plant and machinery rent (2/3 rds. of 6% on $37,642.95 5 months)	627.38
Insurance	191.01
Taxes	173.54
Telegrams, etc.	7.32
Profit	2,123.93
	$31,500.00

Cost Statement

Box cost	$117.505	
Profit	8.495	$1.26
Percentage of profit on selling price		6.74
Soft wood used per box	Ft.	12.79
Hard wood used per box	Ft.	5.85
Percentage of waste, soft wood		15.95
Percentage of waste, hard wood		7.7

Cost per Box on Material, Labor, etc.

	Cents
Softwood	27.88
Hardwood	19.67
Screws	10.23
Nails	.26
Wire rope handles	13.17
Iron bands	2.56
Glue	.52
Sundry	.13
Total material	74.44
Shop wages	28.15
Office wages	1.20
Freight	5.90
Power	1.67
Depreciation on special machinery	1.19
Machine repairs	.93
Plant and machinery rent	2.50
Insurance	.76
Taxes	.69
Total overhead	8.99

Order Nos. 6235 and 6805

August 29, 1916. 3,334 3 Rd. Shell Boxes for 4.5 in. Howitzer H.E. Shell.

October 2, 1916. 5,667 3 Rd. Shell Boxes for 4.5 in Howitzer H. E. Shell.

Price eighty cents each.

3,334 Boxes at 80 cents each	$2,667.20
5,667 Boxes at 80 cents each	4,533.60
	$7,200.80

Material

90,564 ft. softwood	$2,078.31
16,719 ft. hardwood	408.03
9,020 pairs handles	757.03
9,100 pairs bands	720.01
Screws	774.76
Nails	104.20
Sundry	9.65
	$4,851.99

Less		
Discounts	$ 9.50	
C. P. R. claim	67.30	
	76.80	
		$4,785.19
Wages		1,761.09
Wages, office		86.22
Power		133.48
Freight		88.99
Machine repairs		20.81
Sundry expenses		7.33
Interest on plant and machinery		200.25
Insurance		57.82
Taxes		47.43
Balance		22.19
		$7,200.80

Box cost	79.753c	
Profit	.247c	80c
Percentage of profit on selling price		.308
Waste percentage, softwood		11.77
Waste percentage, hardwood		17.08
Total material per box		53.16c
Total overhead costs per box		5.81c

Cost Per Box on Material, Labor

Softwood, board feet		10.06
Hardwood, board feet		1.85
Softwood, cost	Cents	23.08
Hardwood, cost	"	4.53
Labor		19.56
Handles, rope		8.39
Steel bands		7.91
Screws		7.75
Nails		1.15
Administration (office)		.95
Power, per box		1.48
Freight		.98
Machine repairs		.23
Interest on machinery		2.22
Insurance		.64
Taxes		.52
Nails in each box, number		70
1¾ in. screws in each box, number		10
1½ in. screws in each box, number		10
1¼ in. screws in each box, number		8
¾ in. screws in each box, number		14

Re hardwood. Bought 15,000 feet birch at $20 per M., accounting for low cost of hardwood.

* * *

Editor Canadian Woodworker: We received one contract in 1915 for 25,000 4.5 boxes, at $1 each, which was completed early in 1916. Details of costs on these boxes are presented herewith:

25,000 4.5 Shell Boxes at $1 each, Year 1915

Labor	3861.81
Lumber, 250 M. feet	8519.31
Glue, 468 pounds	67.81
Nails, 9,500 pounds	254.00
Screws, 5,470 gross	1047.08
Rope handles, 25,000 pairs	2110.06
Steel bands, 25,000 pairs	1241.25
Rubber stamps and indelible ink	9.35
Freight and cartage	166.04
Sandpaper	16.93

Overhead expense		2317.17
Special machinery, cost installed	1544.55	
Special machinery, sold for	725.00	819.55
Total cost		20,430.36
Profit		4,569.64
Proceeds		25,000.00

Summary—Cost Per Box

Labor	.15.4
Materials	.53.8
Overhead expense	.09.3
Special machinery	.03.3
Net profit	.81.8
Profits	.18.2
Selling price	1.00.0

The price of nails, screws, and steel bands has advanced since to more than double the above prices, so that if all other items had increased at the same rate this box should be worth to-day $2, but we believe a fair estimate would be $1.35, which shows very plainly how much greater the advance is in the metal industry compared with the wood.

We have refused to quote prices on shell boxes for over a year, because we got tired of submitting figures that were always "too high," consequently any figures we can give are of too old a date to be any real value. Roughly, we could estimate the present value at 50 per cent. advance on prices mentioned below, which were all submitted at least 15 months ago: 6 round, 18 pr., 92 cents; 2 round, 4.5 in., 88 cents; 2 round, 60 pr., 80 cents; 2 round, 6 pr., 95 cents; 1 round, 8 pr., $1.40; 1 round, 9.2, $1.65.—Subscriber.

Shell Box Hardware

One of the most important features of the shell box business has been the amount of hardware used. Figures given by manufacturers, and which appear elsewhere in this issue, give some idea of the amount of money expended on this item.

The hardware used includes nails and screws of all kinds, special rods with wing nuts for the Bethlehem box for holding the end in place, iron bands, wire rope, rope handles, and other items too numerous to mention.

There is no doubt that the price of these articles has increased greatly since the shell box business started. The increase in prices of all grades of metal has been responsible in most cases. Although the demand has fallen off slightly for these articles lately, owing to the decrease of contracts for certain types of shell boxes, yet the business is still important.

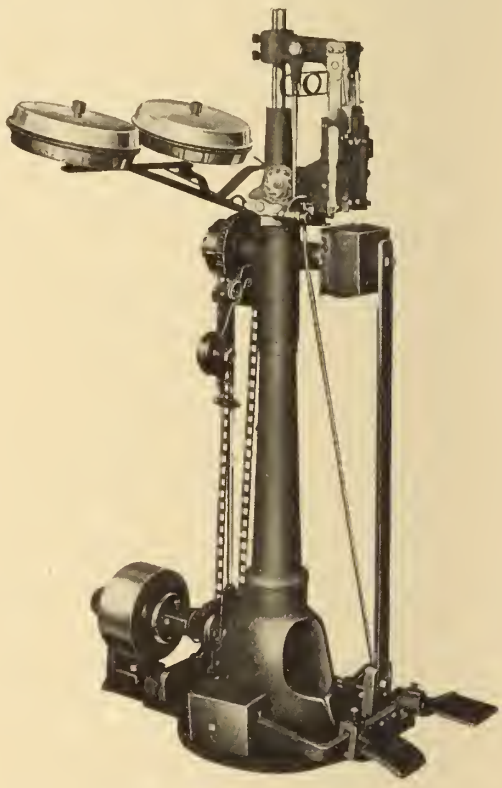
The Munitions Board are reported to be prepared to let contracts now for Bethlehem boxes to all the plants capable of turning them out in sufficient quantities and providing them with orders to keep their plants running till the end of this year. This means that there will be a very large demand for all the items of hardware used on this box, nails, screws, wire rope, and the special rods with wing nuts.

Besides the Bethlehem box there are other types being made at present, for which a great deal of hardware is required. These are probably not being made in such large quantities as formerly, but nevertheless there is a great deal of business available for the hardware firms.

Basket Making Machinery

There is perhaps no industry in which greater strides have been made than in the manufacture of berry boxes, baskets, etc. The machine illustrated here is an automatic quart basket stapler, manufactured by the St. Joseph Iron Works, of St. Joseph, Mich. The company state that this machine will turn out baskets at the rate of 5,000 per day of ten hours.

The form over which the basket is shaped is attached to the machine, the stock being held in place by a hood or follower. The form is revolved automatically, the outside band wound on mechanically, and two staples made and driven at each stroke of the machine. Four strokes complete the basket. It is said that after a little experience an operator can make an average of 4,500 baskets per day of ten hours, and instances are known where the output has run as high



Will turn out 5000 baskets per day.

as 6,500 in ten hours. This latter, however, is an exceptional output, and could not be depended upon day in and day out.

The old method of making the bushel stave baskets was to have a wooden form, bound with iron straps, from which the basket was shaped and nailed up by hand. This work is now done by an automatic stapling machine, on which the basket is formed automatically, the outside hoops rolled on, the form revolved automatically, and staples driven in both outside hoops at the same time. With this machine it is possible to turn out 175 dozen baskets per day, where formerly the output ran about 25 or 30 dozen baskets per day for one operator.

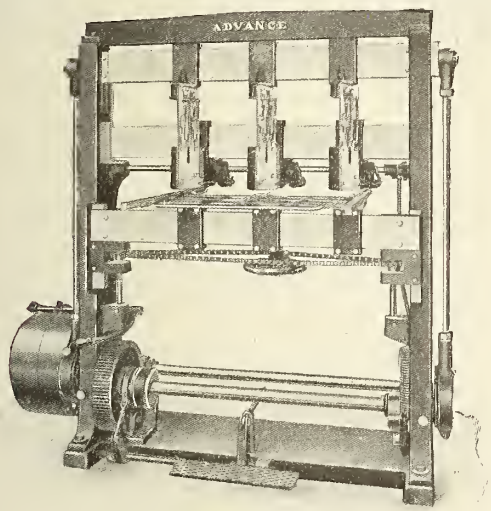
Another noticeable improvement has been in the manufacturing of Climax baskets. Years ago these baskets were practically all nailed, 500 being considered a good's day's work. Now, by the use of the improved double-head stapling machine, on which the

form is revolved automatically, from 1,500 to 2,000 baskets per day can be made. The nailed fruit package is becoming a thing of the past, as those made by machinery and finished with staples have proven much more uniform in sizes, besides being neater and stronger.

Side Stapling Machine for Crates

The side stapling machine shown on this page is manufactured by the Saranac Machine Company, of Benton Harbor, Mich. It is used extensively in the United States and in Canada for the manufacture of crates of all kinds, some of the principal ones being the American quart crates, Dalstrom crates, and Dixie crates. The machine is built in different sizes, ranging from 48 in. to 90 in. The stitching heads are adjusted, and any number of stitching heads can be used in the machine. The usual equipment is three double stitching heads. These heads can be adjusted to any position between the side frame.

In operating the machine the stock is either assembled by hand or fed from the hopper to the all-steel



Machine for stitching crates.

carrier chain, which conveys it into the guide. Here it is held firmly by mechanical means while it is being stitched. The intermittent feed is so timed by a ratchet that the spacing is accurate. The manufacturers of this machine state that its capacity is 15,000 complete crate sides per day of ten hours.

Have Quebec Firms an Advantage?

Editor Canadian Woodworker: We have tendered on 4.5 and 60 pr. shell boxes, and we do not consider that the price the Munitions Board paid for either of these boxes was sufficient to net the manufacturer any profit.

Another big feature of the shell box making is that it is an impossibility for the Ontario manufacturer to compete against the manufacturer who is turning out boxes in the Province of Quebec, inasmuch as Ontario has been drained of her men, with the result that wages have approximately doubled, while in Quebec six thousand have gone out of a population of two and a half million, leaving plenty of help and low wages.

We believe that the Munitions Board should take conditions of this kind into consideration, as their past actions have simply encouraged the French-Canadians in not enlisting.

The writer has two brothers in uniform, and the same can be said of about every second family in Ontario; and if it is a fair proposition for the French-Canadians to stay at home and work on shell boxes because they can get them out for a few cents less than Ontario manufacturers, all we can say is that it is a very improper distribution of the Canadian business.

Ontario Manufacturer.

Auto Truck Delivery

At a convention of box manufacturers in the United States one of the members gave some interesting data on delivering boxes with auto trucks. He spoke as follows:

"The expense on a box after it is finished on the nailing machine is far more than most of us figure it to be. It must be taken to loading platform and left on loading platform until its turn comes to be delivered. With teams, if your customer is close—say, one mile from your plant—your expense is not so high, but if you must go from three to eight miles, as we are located from the trains, you have trouble far more than in the mill. What do you gain by rushing an order through the mill for a customer that calls up, all out of breath, without having known that his stock of boxes had run down lower than he figured? You rush his order through the mill by your foreman. You have other orders waiting on your loading platform for the team and wagons, but they have been out on trips from four to six miles, and you wonder what to do for your customer, who has asked you to favor him just this time.

"Just five months ago I was using six teams and wagons and they did not keep the loading platform clear. I figured for a long time on some way to keep this expense down, as it was more than I could get my trade to pay. At this time an auto salesman called on me and offered to sell a big truck to cost from $3,000 to $3,500. I figured that it would take about four of these trucks to handle my output, but a $15,000 investment was more than I could afford to meet. A few weeks later a salesman for the Smith-Form-a-Truck called and offered to sell me a one-ton truck and build a suitable rack body for $900. I bought a machine at once, and after placing it in operation I was able to do away with four of my teams. The platform is cleared at all times now, and my mill cannot work fast enough to clog it at any time. They leave and return with a load on a six-mile haul in one and a half hours. I am now using two machines and two teams, and I intend to dispose of the other teams in the spring. I have ordered two more machines, which will arrive in time to be put in operation March 1. As to cost, my teaming costs me 94c a thousand, and with the auto we have cut this to 50c per thousand.

"I give herewith the average cost per day for maintaining one of these trucks. The haul is six miles.

Seven trips, 1,200 ft. per trip ... ... feet	8,400
Driver's wages	$2.25
3½ gal. gasoline at 21c	.74
¼ gal. lubricating oil	.11
Repairs, five months' test (mostly carbon trouble) ...	.18
Depreciation, 25 per cent.	.75
Insurance liability (Property damage)	.17
	$4.20

"The results are that we are able to give service; mill always cleaned up; saving some labor on taking boxes from machines direct to loading truck; not rehandling."

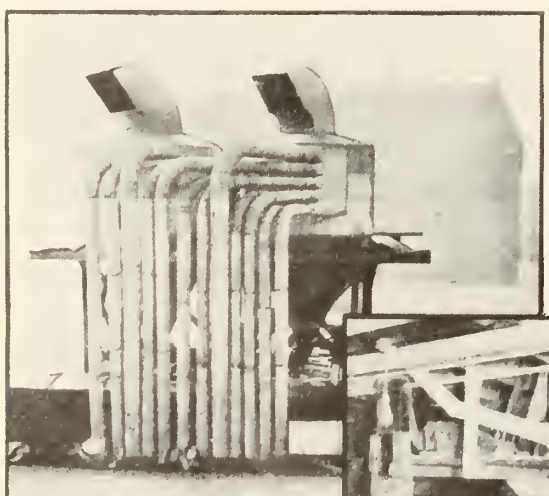
Individual Exhausters in a Box Factory

New Development in Application of Electric Current — Motors Supported on Frames Below Floor Operate Machine and Blower

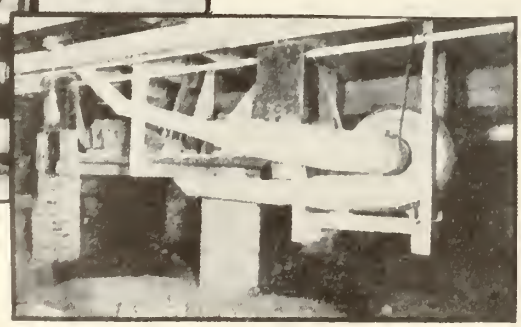
We are enabled, through the courtesy of Mr. George H. Jones, power engineer for the Commonwealth Edison Company, of Chicago, to publish for the benefit of our readers the details of an interesting development in the application of electrical current in woodworking plants. Mr. Jones states that in his observations he has noted that in certain types of woodworking factories there are generally a great many more machines than there are operators, and for that reason considerable power is wasted in exhausting shavings.

In the new plant referred to an individual motor is applied to each machine, and to the machine is belted an exhauster of sufficient capacity to handle the shavings from the one machine. This exhauster is individually piped to the cyclone. By this method when any one machine is out of service there is, of course, no power being consumed for its part of the exhaust system. Mr. Jones advises us that a number of woodworking plants in Chicago are equipped in this manner, and that excellent results are obtained. A description of the box factory of Mr. Harry R. Gibbons, with the main features illustrated, is furnished us by Mr. Jones, and is published below:

In this factory there are 38 individual machines for the making of wooden boxes, each machine being directly connected with an individual General Electric, 220-volt, 60-cycle, 3-phase, high-speed motor, none of which are over five horse-power. Each of these motors is supported on a frame about two feet below the floor on which the machine it drives stands, thus eliminating the usual waste in power incidental to shafting and belting. Being directly below the machine it drives, the motor is connected to it by a very short belt, never exceeding five feet. This is said to be one of the best economical features of the installation, saving as it does the enormous amount of power that is absorbed by friction of idle pulleys and resistance of air when any great amount of shafting is used. Shaft drive from an engine in a large factory usually wastes 50 to 75 per cent. of the total power.



View of cyclones on roof of factory, showing separate connections from individual blowers. One set gathers sawdust only into one cyclone. The other set gathers shavings only into the other cyclone, enabling both to be sold at a price that pays the entire power bill.



View under factory floor, showing one set of saw motors. The blower to the right is driven by the cross-cut saw motor in the centre.

The total horse-power used in the H. R. Gibbon's Box Company installation is 110, distributed as follows:

Seven rip saws, each using 3 horse-power motor; six cross cut saws, using a 2 horse-power motor each; one cross cut saw, using a 3 horse-power motor; two board matchers, each using a 5 horse-power motor; eleven box nailers, each using a 3 horse-power motor; two groove saws, each using a 3 horse-power motor; one hand hole cutter, using a 5 horse-power motor, one pony planer, using a 5 horse-power motor; one printing press, using a 2 horse-power motor; one printing press, using a 3 horse-power motor; one sanding machine, using a 5 horse-power motor; three individual blower for planer, groove saw, and hand hole cutter, each using a 1 horse-power motor; ½ horse-power motor for machine shop tools.

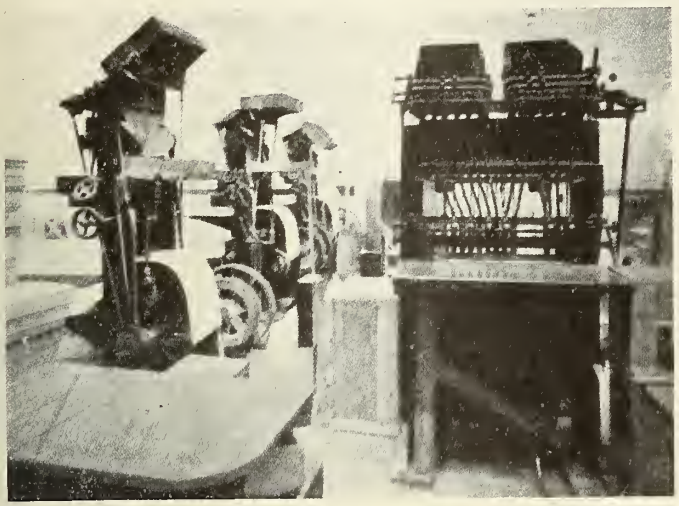
The 2 and 3 horse-power motors used to drive the saws may appear to be very small for such work—and they would be if the operation of cutting a board was more continuous. But as only one second of time is needed to cut a board crosswise and only eight lengthwise, any speed the motor may lose during the operation is made up after the operation is complete and before the next cut is ready to be made. The 3 horse-power motor has sufficient inertia, and drives the rip saw with enough velocity to complete the cut, and the 2 horse-power motor is more than enough to complete a cross cut, the excess energy being used to drive a blower connected with each pair of saws which carries the shavings and sawdust to the roof. By this method not only are motors of few horse-power usable, but when a saw or machine is not in use the power on that particular unit is shut off, the whole resulting in the use of the minimum amount of electrical energy, and, hence, inexpensive, economical operation.

The cross cut and rip saws are run in pairs, the cross cut being made first to get the length, and the rip or lengthwise cut made last to get the width. To each of these saws a galvanized iron pipe is connected, which draws the shavings and sawdust down separate pipes to the blower, which is placed beside the two motors that run the saws. This blower is operated by the same motor that runs the cross cut saw, and is connected to that motor by a belt, which is attached to the twin pulley. The by-product is whirled through the blower and forced through a pipe that runs up the inside wall of the building to the roof, where it enters one of the big tanks. This is for the sawdust; the other for the shavings, which are whirled around inside these tanks by the force of the air blast, dropping by gravity into the spout at the bottom. Under these spouts a wagon drives, the trap at the mouth of the spout is opened, and the by-product drops into the vehicle. In this way neither the shavings nor the sawdust are handled once, the whole being done by electricity and gravity—another saving, this time in man-power.

But the most important economy in an

installation of this kind, aside from the simplicity and convenience of electric drive, is that **the money derived from the sale of the by-product is enough to pay for the power used.**

After a board has been cut up into pieces of size there invariably remain small pieces of wood which



The Nailing Machines. Driven by motors directly underneath floor. These machines nail the five sides of a box together in record time.

cannot be used. These small pieces, with the shavings and sawdust collected when steam drive was used, were thrown into the fire under the boiler for fuel. Now these pieces of wood are collected and sold for kindling wood, the sawdust and shaving are collected separately in the manner described, and the money derived monthly from the sale of these by-products more than pays for the energy consumed and the depreciation on the motors. Another saving is that the salaries of an engineer and fireman are dispensed with, the Commonwealth Edison Company supplying the electricity. Only a little of the refuse is burned during the winter to heat the building.

This thoroughly unique and practicable scheme of power utilization was planned by a representative of the contract department of the Commonwealth Edison Company. It represents the ideal for a factory of this kind, combining as it does simplicity, convenience, and the entire elimination of waste. It is a modern idea for a modern factory. Under the schedule of rates employed by the Commonwealth Edison Company the rate paid by the H. R. Gibbons Box Company is approximately 3 cents per kilowatt hour.

The method of lighting this modern factory is very thorough, practically approximating the ideal. The illustrations show good daylight lighting, and when overtime work is necessary the electric lighting system provides illumination which practically equals the light of day. Twenty-eight 150-watt lamps are suspended from the ceiling in three parallel rows the length of the building, giving an equal distribution of light over the entire floor. They are set ten feet above the floor in federal enameled steel reflectors. This lighting system was planned and installed by the Commonwealth Edison Company.

The proper size of shaft for ordinary line shafting may be determined by reference to tables in any of the popular mechanical engineers' hand books, and also in a number of the manufacturers' catalogs. The information given in these tables is generally reliable and consistent with good practice.

Shell Box Business in Montreal

Shell box manufacturers in Montreal are, speaking generally, only moderately busy. One or two firms are running to nearly full capacity; some are turning out comparatively small numbers, while the contracts of others are just about completed, and at the moment of writing no further orders are in sight. There has been a change since the first contracts were given out, bath as to firms engaged in this branch of the woodworking industry and as to prices. Certain manufacturers who obtained early orders are stilling, but other have dropped out, either because they were badly equipped or found the game unprofitable, or were unable to secure further orders at the close competitive prices which now prevail. Others, again, who weer not box makers took orders with a view to keeping their staffs together until such time as business in their own lines improved.

Conditions have now got down to something like a stable basis, although all manufacturers agree that the margin of profit is very narrow. In no class of munitions work has there been such keen competition as in boxes, and the fact that several contractors have been unable to carry out their orders at the agreed prices shows that the competition has not always been on sonud lines. While prices have undoubtedly improved, manufacturers say they are not yet sufficiently high, having regard to the continual advances in lumber, hardware, etc. These advances are an uncertain quantity, and if a box maker wants to be on the right side he has to make a fairly liberal estimate for such contingencies. The firms who are able to conclude arrangements for protecting themselves by buying large quantities of lumber, etc., are the ones who are likely to make a profit on the contracts. The men who, as a rule, have been unable to fill their orders are those who have trusted to luck as far as purchasing the raw who have trusted to luck as far as purchasing the raw materials are concerned. They have found, to their cost, that lumber has continually risen, and that the foundation on which they based their prices has been unreliable, particularly when some have omitted to figure on overhead charges in making bids. "The only way we can make any money out of shell boxes at present prices," said one manufacturer, "is either to receive a very large order or a sufficient number of small ones to keep us busy. It is only the fact that we are turning out considerable numbers that enables us to make a living profit. We figure our costs very closely, as we are bound to do in order to get business, but we are assisted by the circumstance that we are able to use all the waste lumber for other purposes. If we were not turning out such large numbers of boxes we should be unable to quote at the prices now obtained."

Recently two Montreal firms engaged on shell boxes assigned, one being a heavy failure. It is asserted that in one case an important factor was the cutting of price, combined with a miscalculation as to the course of markets for raw material. Competition is no doubt a good thing, but the mad scramble to get orders has proved the undoing of some firms and forced prices down to a level which has affected other woodworking concerns.

Mental inertia is the cause of many a failure.

Diaphragms for Bethlehem Shell Boxes

These Now Being Framed Up from Solid Hardwood—Stock is Machined Rapidly and Accurately on Specially Constructed Machines

Staff Article

About a year ago, when the first orders for Bethlehem shell boxes were placed, the specifications called for three diaphragms, as shown in the drawings at the bottom of the opposite page.

Some time ago Mr. Thomas Gale, of Oshawa, con-

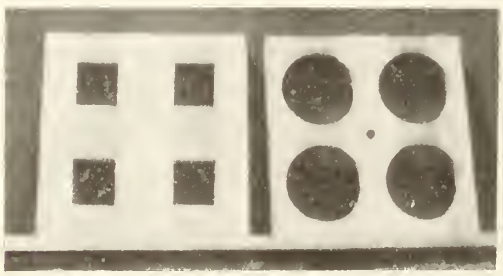


Fig. 1—Diaphragms before and after being bored.

ceived the idea of making these diaphragms by framing them up of solid stock. He thereupon set to work to devise the machines for machining the various pieces. The results achieved are a credit to his mechanical ability.

In the first illustration two diaphragms are shown, one before being bored and the other after. The various pieces are fitted into each other, so that when the glue has been applied and the whole thing clamped up the diaphragm is almost indestructible. The first operation in machining the pieces after the stock has been cut roughly to length consists of ripping it into widths. This is done with a gang of saws. A saw table constructed of wood, with a slide attachment for holding the stock secure while it is being ripped, and which absolutely protects the operator, permits a great amount of stock to be ripped up in a very short time. Mr. Gale explained that in order to balance the weight of the gang of saws it had been found necessary to

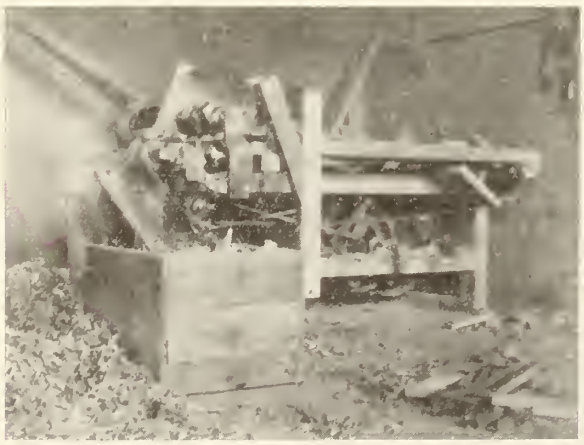


Fig. 2—Machine on which dadoing is done.

attach an iron pulley on the opposite end of the saw mandrel.

After being ripped to width the stock goes to the two machines shown in Figs. 2 and 3. These machines are practically the same as regards the framework. The machine is shown in Fig. 2 has solid cutters for dadoing out the ends and centre of some of the pieces. The pieces are fed on to a board, over which a chain travels constantly. Pieces of wood are attached to the chain at intervals to catch the stock being fed through. Where the stock passes between the cutters a brush or pressure bar made by running saw cuts in a piece of wood is used to hold it down. The amount of stock that can be put through this machine in a day can be imagined.

The machine shown in Fig. 3 has an endless chain just tht same as the one in Fig. 2. On this machine two circular saws attached just where the stock enters under the pressure bar cuts the pieces accurately to length. Then two grooving saws on upright shafts groove the ends of the pieces to the necessary depth. By looking closely at the picture the reader will be able to see one of the grooving saws and also a piece of stock which has just passed the groovers.

The same ingenuity shown in devising these machines has been used in connection with the clamping

Fig. 3—Machine for grooving ends.

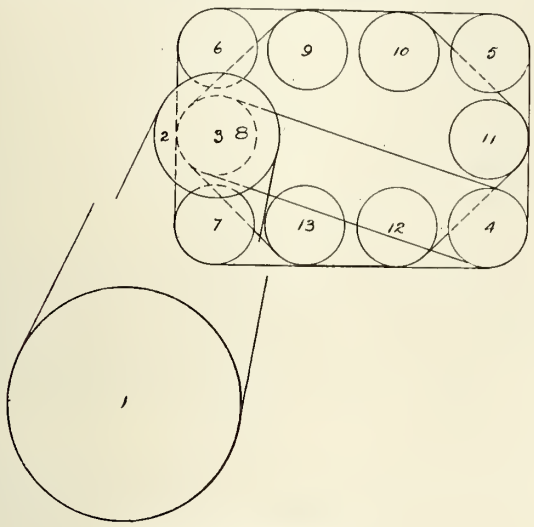
and boring of the diaphragms. The pieces are assembled and glued by women and then passed over to be clamped. From the drawings it will be noticed that there are five holes in each diaphragm, and that the large holes vary in size for each diaphragm. The boring has been taken care of by rigging up some turning lathes. Motors were attached to the beds of the lathes. These were direct connected to gears which operate the bits. For the large holes heads bearing a slight resemblance to a sticker head and accommodating three cutters are used. A spindle attached to the centre of the head and carrying a disc pushes the core out of the hole.

The heads carrying the knives are stationary. A travelling rig which is operated with a foot lever is pressed up against the cutters. The diaphragm fits against two pieces of ¼ in. iron which are arranged at right angles, and with a space so that the shavings do not have to be blown out every time a diaphragm is bored. An eccentric lever holds the diaphragms tightly in place while they are being bored.

Promotion invariably comes to the man who is doing well what he is doing.

Machine for Boring Ten Holes at Once

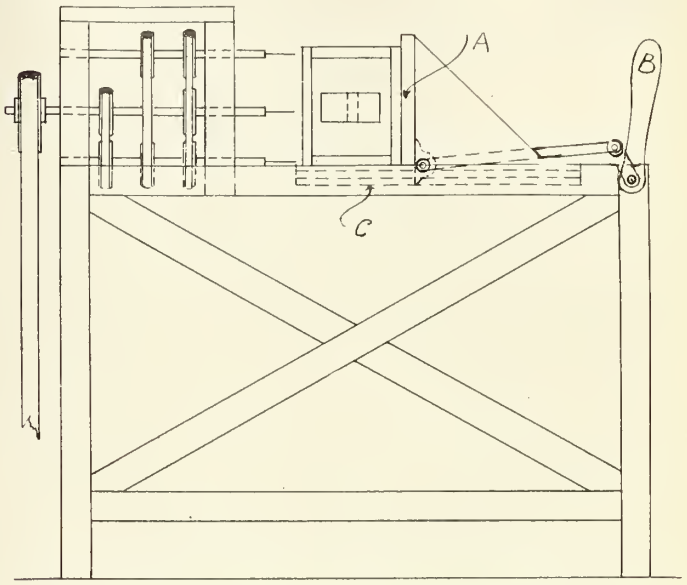
The two illustrations shown herewith of a machine which we recently rigged up for boring the screw holes in the lids of shell boxes may be of interest to readers. The box is placed again the piece A (Fig. 1), the lid placed against the box, and a slight push on the lever B shoves the box against the bits, which have counter-



Showing arrangement of belts.

sinks attached. Thus ten holes are bored and countersunk at one operation.

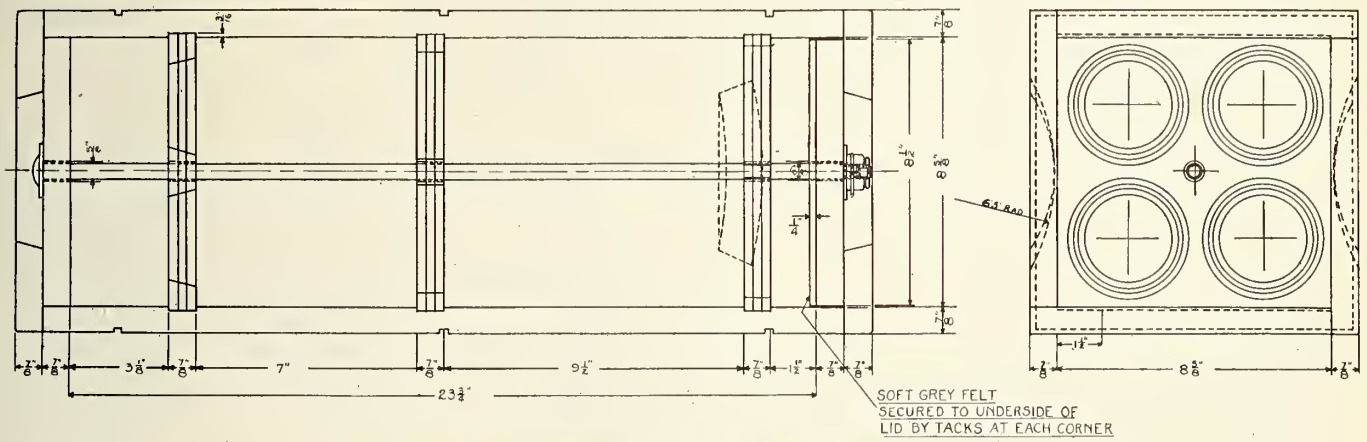
A reference to Figs. 1 and 2 will show the arrangement of the belts and pulleys. Pulley No. 1 drives pulley No. 2. Pulley No. 3 is on the same shaft as No. 2 and drives No. 4. No. 4 drives Nos. 5, 6, and 7. Pulley



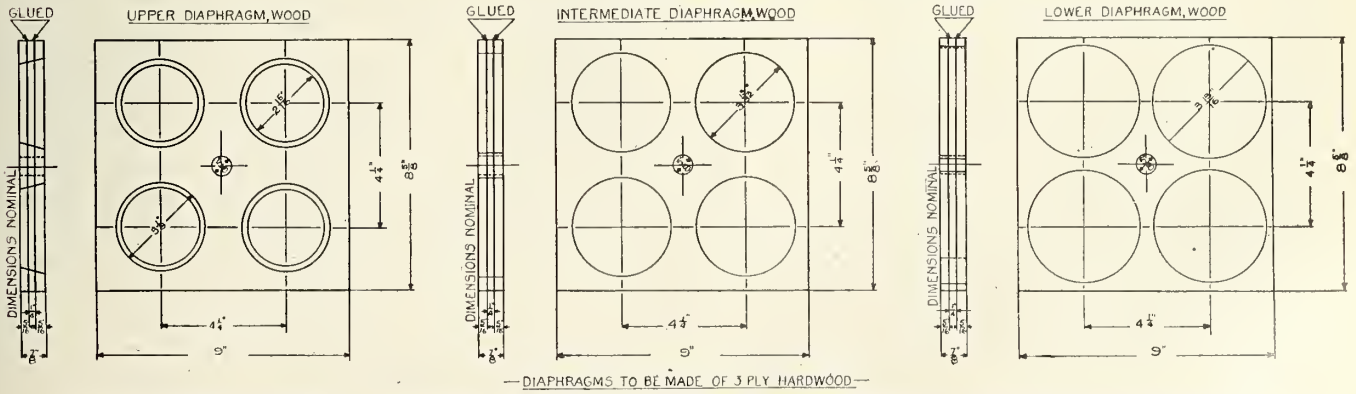
By moving lever B, box is forced against bits.

No. 8, being on the same shaft as No. 3, drives No. 9, 10, 11, 12, and 13. The frame of the machine is constructed of hardwood. The table on which the box rests slides back and forth, as shown by the dotted lines at C, Fig. 1.

This machine is easily constructed, and where the order is for a quantity of boxes pays for itself very quickly.—J.B.



Plan and end view of Bethlehem shell box. Lid held in place by wing nut.



Three diaphragms or divisions that hold shells in places. Original specifications stated that they were to be made of 3 ply hardwood.

Box Association Adopts Cost System

Committee Points Out Importance of Each Manufacturer Using Same Method—Chart Shows Classification of Charges Suggested

At a recent meeting of the National Association of Box Manufacturers held in the United States, a subject that was discussed at some length was the adoption of a system of cost accounting for box factories. The committee on cost finding and cost accounting, after having given considerable attention to the subject, submitted the following, which was accepted and adopted as the official cost system for the association.

In approaching the subject of cost accounting for our industry, we must, in order to make progress, lay aside many of the time-honored customs to which we have clung so steadfastly. It is true that the history of our business is not measured by centuries, but only by four or five decades. During the greater part of this period business in general was conducted by very exact standards, and there was usually a large enough margin of profit to venture a guess as to costs. Conditions have changed, however, and all about us we see industrial enterprises conducted upon an exact knowledge of what it costs to produce and market merchandise.

Mr. Hurley, of Federal Trade Commission fame, makes the statement that the excellent financial condition which the iron and steel industry is in today is due in a marked degree to the attention that has been given to the important question of business policy, and a definite knowledge of their true cost of production and distribution.

The custom, in particular, to which we referred in the opening sentence of this paper is that of arriving at a price for packages, per 1,000 board feet of product. The variety of our product is too great, and the conditions affecting manufacture and delivery, both with respect to form and quantity, too complex to be dealt with in this manner. It has already become evident to some of you that we must treat each of the elements in our product separately. We should fix a price upon the lumber required for any given package, and the same with the labor and factory overhead, and administrative expense. We should no longer satisfy ourselves with a profit on a part of our business and a loss upon the remainder.

This is a condition which has contributed largely to our disappointment, when at the close of the fiscal year the balance sheet showed a much smaller rate of profit than we had anticipated. We owe it not only to ourselves, but to our employees, our creditors, and yes, even to our customers, to correct this evil. Let every man of us strive for a state of affairs that will assure a profit on every item of business, and if a loss must be incurred, that we incur it with our eyes open and know exactly to what extent. The lack of an adequate cost accounting system in a factory is like a ship without a compass. It makes it impossible to direct business intelligently and scientifically. What is true relative to the individual factory applies with greater strength to this gathering, if one of its purposes is to achieve something worth while for the industry as a whole. We appreciate the difficulty of presenting to this meeting a plan of cost accounting, because in order to receive a favorable reception, it must be ample to accommodate the requirements of the manufacturer who makes shooks, nailed and lock-cornered boxes, and delivers by wagon and carload, as well as the manufacturer who makes only a very limited range of shooks and delivers in carlots only.

We have endeavored in the accompanying chart, to make the classification of charges comprehensive enough for the most complicated unit. By eliminating such materials and labor as do not arise in shook factories generally, the plan will also be adaptable for them. You will see that the cost of packages has been divided into—

Materials and Their Waste.

Productive Labor.

Factory Overhead.

Administrative Expense.

A great deal of good cannot be accomplished unless we all treat these elements in exactly the same way. It is contemplated under this plan to make monthly charges to the box factory for materials and other items of expense, so that a monthly statement of profit and loss for twelve succeeding months will show the same results as the annual statement would.

Lumber

To this account would be charged only the items of cost indicated in the chart. Prime cost and freight being readily ascertainable, it is necessary only to spread over the number of board feet consumed, the remaining items of expense. This charge is ordinarily not a large one, and

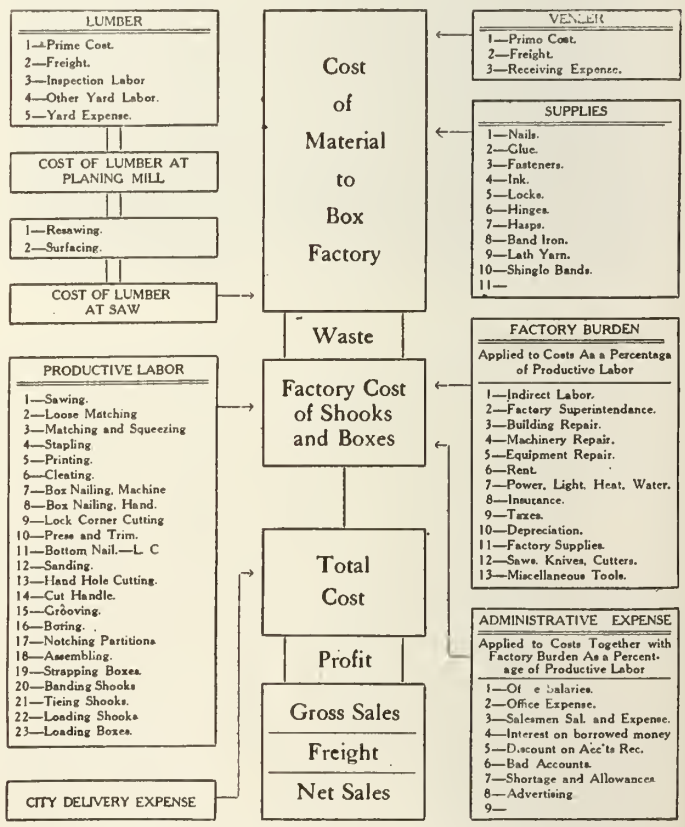


Chart showing how to allocate charges in figuring box factory costs.

by adopting a charge which represents the cost over a number of months, no error of consequence is possible in this application. This brings us to a cost for lumber delivered at the mill. The cost of planing mill labor can be separated from box factory without difficulty, and the addition of this

to cost of lumber at planing mill gives us cost of lumber at saw.

It is at this point where our troubles begin. The lumber has now been resawed, or dressed, as the case may be, and has undergone this process without any loss through waste. The sawdust and shavings have been charged for in the reduced thickness of the material. At the saw, however, not all boards are of the required length for box or shooks, and a loss results. Also defects in the material need to be eliminated, and this also is a loss. How best to measure this loss? Our conclusions on this point are to account for the number of good pieces produced and their size and thickness, and to tabulate this information. Deducting the total of these items from the quantity of lumber consumed, leaves the waste. The percentage of this, however, should not be based upon the raw material consumed, but upon the product made. The reason for this is evident, for in applying waste it is always added to the net feetage of the product.

Veneer

This commodity is not so extensively used as lumber and when it is used it is usually converted into shooks at the plant where it is produced. Therefore, storage charges are ordinarily taken into the cost of the veneer itself. Waste in this item, according to my views, is subject to the same treatment as waste on sawed lumber.

Supplies

Under this heading would be included such items as are commonly considered direct supplies. This means that they become a tangible part of the product. Standards can be devised for applying these items in their proper quantities to each order. This would be preferable to considering them as an item of overhead.

If, in the final determination of this subject, however, it is decided to treat such things as nails, glue, fasteners and ink as overhead items, they can, with safety, be loaded upon the productive labor charges in those specific operations.

Productive Labor

Under this heading we have attempted to enumerate all of the operations which take place in a box factory whose product is diversified. Several means might be used to ascertain the total amount of productive labor accruing in a plant during the month. One which is most commonly used is that of providing each employee with a daily time ticket to be filled out showing the different operations at which he was engaged, and upon completing the recapitulation of these tickets at the close of the months, charge each operation with its proportion.

The plan which we have found more satisfactory, however, consists of the use of a production report to be filled out by one member of the crew at each production unit. That is to say, a ripper or fitter will report all the work done at his set. The printer will do the same for the machine which he has charge of. A framer will report for an entire nailing set, and so on, through the entire factory. This facilitates considerably the reporting of work against orders, and when these reports are extended, at which might be termed a standard rate of pay, in each of the positions so covered, we arrive at a direct labor charge, of which every cent can be properly allocated to specific orders. The sum total of such a distribution of productive report, subtracted from the entire payroll, leaves the items of indirect labor, which forms a part of the factory burden.

Factory Burden

The items classified under factory burden are intended to be all those charges which arise out of the operations of the factory. Just how this item of expense should be absorbed has always been an open question among accountants. The committee believe that we are engaged in a conversion of lumber and other materials into packages. Those items of expense which have to do directly with this conversion should be born by the most dependable factor in this conversion. That factor, according to our views, is productive labor. Hence our recommendation to apply these charges to costs as a percentage of productive labor.

Before passing this classification of accounts we wish to say a few words regarding the charge for depreciation, for no item is so important and so frequently ignored as this. Charging off adequately for depreciation of plant equipment is of vital importance to every man interested either directly or indirectly in business. Where this is not done, the manufacturer is using cost figures which are too low, as a basis for his selling price. Every machine, building and apparatus, like every man, has a certain period of life, and no matter how much care you take of a machine, or how much medicine you give a man, death is bound to come to both. New inventions, or new processes, may at almost any time render a large part of the existing plants in an industry useless. The manufacturer who ignores these improvements cannot compete with the manufacturer who, by adopting them, decreases his cost and improves the quality of his goods. Making provision for depreciation is not spending money. It is simply charging the purchaser for the use of equipment and machinery as a legitimate part of the cost of production, and putting the amount received in a drawer separate from profits. Not the manufacturer, but the customer, should bear this expense, and in the long run it is to his interest to do so.

For this paragraph on depreciation we are indebted to Edward N. Hurley, who first gave expression to it in his recent book, "Awakening of Business."

Administration Expense

The items of expense which come under this classification are more general in their character than those enumerated under the head of factory burden, and it might be argued by some that to apply them to costs in the same manner as prescribed for factory burden would be theoretically incorrect. For the sake of simplicity, however, we shall recommend this application. The proposition would be somewhat different if we were engaged in the manufacture of a stock article, the sale of which did not take place until after the manufacture had been completed. In business of that character particularly the selling expense is a considerable item, and should be segregated. In our business, however, we ordinarily only manufacture what we have already sold, and our principal concern is that we be reimbursed for all expense of every nature that we have incurred—whether factory, overhead, administrative or selling.

It is doubtful if a more stable factor for loading this expense onto our product can be found than the productive labor. If we all concur in this view, we are sure we will get an ample return upon our product, whether the package be one of small or large dimensions.

If, in the foregoing we have not gone into the detail which some of you might feel the subject deserves, it is because we wanted to impress most particularly the necessity of determining first upon a division of manufacturing charges into several logical, separate and distinct factors, so that when we attack this problem again we will all be speaking a common language, and reach a better understanding as to the cost of our product than we have had heretofore.

The one thing which we should bear in mind in this connection is that if we are to have a business that is worth while, and one that we desire to perpetuate, as far as it is in our power to do, we must get more intimately acquainted with it than to treat it in the superficial way which the board feet has done heretofore.

Geo. W. Hartzell's Plant

A visit to the walnut plant of Mr. George W. Hartzell, at Piqua, Ohio, impresses one not only with the great care taken in the manufacturing of their lumber and veneers, but with the attractiveness of the general surroundings. As you walk along the path leading to the office the first thing you notice is the beautiful shrubbery and flowers, arranged on each side of the walk, while in the distance you see very large piles of walnut logs and butts. The plant and its environments convey the feeling that life is worth living, even in a sawmill. The illustration gives an idea of the size and layout of the plant.

On entering the mill you are immediately impressed with the great care that is taken in the handling of the logs. These are thoroughly washed to remove all grit and then they are taken up an incline by means of a chain carrier system to the saws. As the boards are ripped off one by one they are taken from the saws to a gravity carrier system and very carefully sorted and graded by experienced men. They are piled carefully on trucks and run along the tracks to the first dry kiln and given a steam bath, which extracts all sap and helps to make perfect the kiln-drying process as they pass through the "National" kilns.

One thing that the writer noticed with great interest was that the lumber never leaves the truck on which it is piled after being cut until it is loaded, under cover, in the cars. Apparently every precaution possible is taken to keep the walnut in as perfect condition as possible. The same general care was exercised throughout the entire plant. In the veneer department a very handsome American walnut log was being rotary cut. Each piece of veneer as it left the knives was carefully inspected and piled so as not to destroy the run of figure. The same care was again shown in the drying of the veneer. In the warehouse the finished product showed the results of the care taken with every detail of the manufacture, and everywhere you looked you saw large piles of the very finest of walnut veneer flitches and in quantities to fill almost any size order without delay.

In the loading sheds attention was called to some exceptionally fine walnut lumber, which Mr. Hartzell said was being shipped to England for aeroplane blades. This company has been furnishing a very large amount of walnut to the allies for this purpose, also for rifle butts.

P. S. Coate, New Partner in Russe & Burgess, Inc., a Canadian

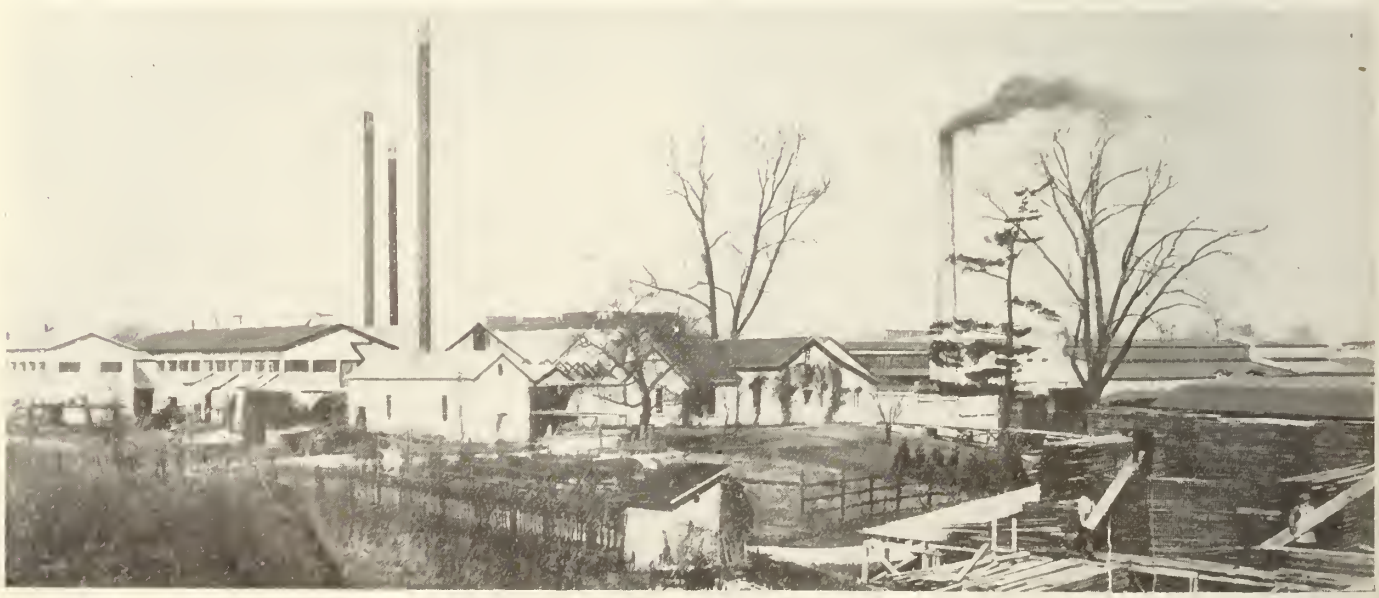
The entire interest of the late George D. Burgess in the firm of Russe & Burgess, Inc., has been purchased by P. Stenning Coate, of Memphis, Tenn. Mr. Coate was born in Toronto, educated at Upper Canada College, and moved to the Southern States in 1882. With his brother, Mr. Charles B. Coate, he started the cotton export firm of Coate Brothers in 1890. A large business was built up, with offices in Memphis, Tenn.; New Orleans, La.; Galveston, Tex.; Houston, Tex.; Fort Worth, Tex., and many other smaller towns. In September, 1916, P. Stenning Coate retired from the cotton business, leaving the business to his brother and nephews, expecting to look after his farm properties and timberlands.

Being interested with Russe & Burgess in a large timber tract, at the death of Mr. Burgess Mr. Russe suggested to Mr. Coate that he take an interest in the manufacturing end of the business, with the result that Mr. Coate bought out Mr. Burgess' entire interest in the firm of Russe & Burgess, Inc.

Mr. Coate's business associates say that he is such a dyed-in-the-wool Canadian that he steadfastly refuses to take out American naturalization papers. Since 1874 Mr. Coate has never missed spending from two to four summer months each year in the Muskoka Lakes district. He still retains the old summer home on Lake Rosseau, which was built in 1875.

Although Mr. Coate has never had anything directly to do with the lumber business he has been a large investor for some years in timber lands. Mr. Coate has already entered upon his new duties. He will have charge of the office and look after all financial matters.

The best type of bearing for line shafting is a well-made babbitted ring oiling bearing with joints neatly fitted to prevent the oil from working out, such bearings are inexpensive to install or replace and easily secured in case of emergency. The ball bearing, for use on line shafts, has been developed by a number of concerns, as has also the roller bearing.



Geo. W. Hartzell's plant at Piqua, Ohio, where high-class walnut Veneers and lumber are made.

Upholstering and Trimming

Pass Increased Prices on to the Dealer

The following letters from manufacturers of upholstered furniture in reply to queries regarding conditions in this industry indicate that prices of upholstering materials are still soaring, and that the only thing manufacturers can do is pay the price and pass them on to the dealer by charging more for their product:

Editor Canadian Woodworker: There is no way to cope with the climbing costs of upholstering materials except in higher grades of furniture, in which case the quality would have to be reduced, such as substituting moss for hair, imitation leather for genuine, etc.

Lumber, springs, filling of all kinds, tacks, coverings, webbing, burlap—in fact, everything in the material line—has increased from 50 per cent. to 200 per cent. Labor is much higher and less efficient. Factories are in most cases undermanned, and output is consequently lowered, and overhead expense increased.

Nothing but substantial and continued advances in prices will cover the additional costs and keep the manufacturers out of the "has been" class. Dealers who want to buy goods at "old prices" will have to stand for cheaper construction and coverings. No economy in manufacturing can be effected to overcome the new costs of raw material.

Annual reports will show very few upholstering concerns who have made any profit during the past year in manufacturing, and if they do not lose a lot of money it will be because of good management and anticipation of present conditions, which will remain or get worse as the war proceeds. Trade has been very active during the past year, notwithstanding the increased prices.—Imperial Rattan Company, Ltd., Stratford, Ont.

* * *

Editor Canadian Woodworker: The prices of the greater part of supplies used in upholstering are still advancing. Some of the lines have not advanced lately, but there has been a general trend for higher prices in the great majority of the supplies required. Some of these supplies are fully 50 per cent. higher than a year ago. It has been impossible to effect economies by substituting other materials in the making of good work.

Some few years ago, before the advent of higher prices on webbing, we experimented with the use of strips of fibre in place of webbing, but were convinced that eventually it would be unsatisfactory, and have, therefore, never used it. We use no imitation leather except on the outside backs, having found no demand for this class of covering in our line of goods.—Baetz Brothers Furniture Company, Ltd., Kitchener, Ont.

* * *

Editor Canadian Woodworker: Prices have advanced from 10 per cent. to 50 per cent. over the prices of last year, and they are still advancing, as, for example, tacks advanced another 10 per cent. to 15 per cent on June 30.

It is a very difficult proposition to substitute any other class of materials for those which are and have been commonly used, and, as regards coverings, the demand is changing from time to time, and at present tapestries are being mostly used on the medium and better class of upholstered furniture and on the cheaper lines imitation leathers.—The Ellis Furniture Company, Ingersoll, Ont.

* * *

Editor Canadian Woodworker: Prices are constantly advancing, and are fully 25 per cent. more than at this time last year. We are unable to procure many of the materials commonly in use a year or two ago, and have to use whatever the manufacturers can give us.

As to using fibre in place of webbing for dining chairs, that has been done to some extent, but it has not proved satisfactory, and we are now using a sort of tin or sheet iron for that purpose, which appears to make a solid and satisfactory case for an upholstered diner seat. We do not know that imitation leather is being used in place of plush, as a great deal of the former has been used for many years. Its quality is being constantly improved, and, in our opinion, it is much superior to real leather or any other covering for many purposes. We try to economize in manufacturing wherever it can be done without interfering with the quality of the output, but, notwithstanding this, costs keep climbing.—The Knechtel Furniture Company, Ltd., Hanover, Ont.

* * *

Editor Canadian Woodworker: The upholstering department is one department in which conditions are very bad. It is not only the difference in price, for even at the advanced prices some of the materials are unobtainable.

Our biggest item in the upholstering room, of course, is leather. This has advanced about 50 per cent., and it is very difficult to get our requirements at that.

You enquire re a substitute in place of webbing. We would advise that webbing is another item which not only has advanced in price, but which we cannot depend on at all for our supplies. Before the war most of our webbing was imported from Scotland, and, of course, the submarine campaign has stopped practically all imports, and there being very little webbing manufactured in Canada, the supply is a great deal less than the demand. You will therefore see that we had to look to something for a substitute. To-day we are using both fibre board and a compressed tin seat for the bottom of chains in place of the webbing. This we find is a very good substitute, being even stronger than the webbing, although same costs us more than the webbing before the war.

As to leather, we omitted to state that through the price of leather going so high the Craftsman imitation is taking its place to a great extent. We are using this

imitation leather a great deal. The craftsman is the best grade obtainable, and in reality is is superior to the split leathers, both in appearance and wear. As to other covering, we use very little outside of leather. We, of course, have a small stock of tapestry, which has also advanced in price. As to velours and plush coverings, we do not carry a line of these.

Besides the coverings and above-mentioned articles, there are all the other upholstering supplies, all of which were advanced in price. The metaline upholstering nails which we used to buy for 60 cents have advanced to $1 per thousand. The upholstering tacks have also gone up about 50 per cent. Upholstering tow, which we used to buy for $25 a ton, to-day costs $60, and it is very hard indeed to get sufficient. There are other lines, such as gimp, wool stock, springs, twine, etc., which have also advanced from 50 per cent. to 75 per cent.

The labor conditions in the upholstering trade are just as bad as any other line; first-class upholsterers are in great demand and very hard to secure.—The Elmira Furniture Company, Ltd.

Saving Money in the Upholstering Department

At the present time, when the prices of upholstering materials are almost prohibitive, any information that will enable furniture manufacturers to save money in their upholstering departments will undoubtedly be welcomed. The following data, taken from "The Cabinet Maker," contains some good suggestions:

In no trade is a good supply of both natural and artificial light more essential than in upholstery. It is impossible to accomplish good work in ill-lighted shops. Unfortunately, the upholsterer too often is the last to be studied in this respect. In the small firms any out-of-the-way corner, or even a basement, is considered good enough for him. The writer recalls seeing upholstery work being done in a basement where the only daylight was that which struggled through an iron grating level with the pavement, and which was augmented by gas jets projecting from the wall. There are many reasons why this state of affairs does not exist to-day. First, the upholsterer is aware of the benefits, financial and physical, that accrue to him by performing his daily work amid healthy surroundings. Secondly, the attractions of the large upholstery firms, with their ideal workshops, provided with plenty of air, light, and space, appeal to him very strongly when seeking a job.

Bad light is often the indirect cause of faulty construction in upholstery work, especially in the case of leather, velvet, and other shaded fabrics.

Shading and Blending Skins

The upholsterer, although he may take great pains, will always work at a disadvantage in a bad light. In the case of leather work, it is impossible to shade and blend the skins. The reader may easily test this for himself. Let him examine, say, an easy chair in morocco, first in artificial light and then in daylight. In the former the leather may appear to be of one color; in the latter he will find, maybe, five or six different shades that cannot be toned together correctly in artificial light. The work in such conditions is liable to look patchy and to offend the eye.

The Matching of Velvets

Velvets are very difficult to match up by artificial light. Some of them possess four distinct shades by reversing back to front and right to left, and where many cuts are to be made mistakes soon occur. All this shows the need for the upholsterer's shop to be one where a maximum of daylight prevails and a minimum of artificial.

The right to work in a good light is one upon which the upholsterer should always insist. It means all the difference between a good and bad weak financially, to say nothing of the loss of time and temper and the inevitable effect on the quality of the work done.

Benches and Trestles

Next to light, a good benchway, with plenty of space, is important. It often happens that where coverings for the work in hand are not available the upholsterer may have several jobs in progress at the same time unfinished. Hence the need for plenty of room, especially where there are many men employed. A side-bench, about 4 ft. 6 in. wide and 3 ft. 6 in. high, fixed beneath the windows, with divided bins beneath for the various stuffings, serves the double purpose of cutting-board and a place for unfinished work. The bins should be boarded up halfway and divided into 5 ft. or 6 ft. lengths.

Trestles should be about 36 in. wide and 30 in. high, with grooved tops, to insure a frame remaining rigid when placed on them. It is necessary to have a high pair and a low pair, the latter to be used for settees or chairs with extra high backs; they will be found useful in many other ways.

Cutting-boards for marking out should be made about 6 ft. 6 in. by 4 ft. for the large, and 3 ft. 6 in. by 5 ft. for the smaller size. These should not be of too soft a wood, as the constant hammering and pritchawl necessitates many holes being made. As these meet close together, the wood soon splinters, and the board becomes useless.

The Stock Room

There is no trade that presents such a large field for economy as the upholstery trade; hence the vital need for a stock-room, where the various hessians, springs, coverings, stuffings, and other materials may be kept, and regularly checked and tabulated.

Where possible this room should either be in or adjoining the actual workshop. In factories where many upholsterers are employed, a stock-keeper is kept, whose duties consist of sorting out the materials and stuffings required for various chairs, settees, and other work. Quantities are kept in a stock book, in which is entered the number or name of each job applied for.

Neglect of Yard-stick and Scales

Where only a few upholsterers are employed, economy is also necessary, and it is wise to have a place kept apart from the worshop itself—a kind of miniature stock-room. The writer, as a practical man, regrets to have to confess that upholsterers are frequently not very careful. To a piece-worker time is money in every sense, and if he is allowed to cut his own materials there is a temptation to neglect the yard-stick and weighing scales; the result of this will be seen on visiting his particular bench. When the job is complete there will be found there remnants of material and stuffings, "to be used on the next," but which eventually find their way into the shop sweepings. When these small items are

multiplied they amount to an appreciable quantity. We see, then, the need for economy in the shop. There are other avenues of waste which might be mentioned.

Where possible, materials should be made up beforehand for the standard jobs, marked, and given out as applied for. This is a god plan to follow in a large factory where an inexpensive class of work is manufactured.

Fittings for the Stock Room

As mentioned above, the stock-room should adjoin the actual workshop. Baskets are best adapted for the conveyance of the materials and stuffings. The stock-room should have a long, wide board running the whole length of that side which is best lighted, also tiers of fixtures for tapestries, cloths, etc., and centre tiers, accessible from all sides, if space permits.

Large, open racks should be provided for the various qualities of hair, and closed ones for flocks, etc.; downs, feathers, and kapok are most liable to waste, and should be separated entirely from other stuffings. Springs should also be kept in racks, with the different gauges distinctly marked. Only just sufficient room should be allowed in width for each gauge; if this is not done they very easily become entangled and useless.

Economy in Twines and Tacks

Much waste will result from the indiscriminate serving out of twines and tacks. In old-fashioned workshops twines were sometimes kept in a long box with a glass front and a lid containing holes; the ends of the twine hung down from the wall, within easy reach when required. A small bag will answer the same purpose. If the balls are allowed to lie about waste inevitably occurs.

Tacks are best obtained in large bags and served out in small ones. Packets are wasteful; the many sizes used on one job render them liable soon to become mixed up and useless.

Buttons, studs, cords, and gimps are also liable to be wasted if not kept in proper compartments.

Relation of Stock-room to Shop and Office

It is very important that everything kept in the stock-room should have a distinctive mark, and that a record should be kept. If this is not done, confusion will exist and the stock-room will be rendered useless as a time-saver. Given a well-regulated system, methodically carried out, the stock-room will act as a control for preventing waste, and be most useful, both to the office and workshop. Numbers are best given to the different styles of chairs; names sometimes cause confusion, especially in dealing with queries from customers. It has been found by experience that a number is more easily passed through correctly from the customer, office, stock-room, and workman than a name. A book of the quantities required for various work should also be kept in the workshop as well as in the stock-room.

Springs Encased in Separate Sleeves

Manufacturers of upholstered furniture who are continually endeavoring to make their chairs, chesterfields, etc., more comfortable will be interested in the spring filling shown here. It is inviting to persons with tired and aching bodies.

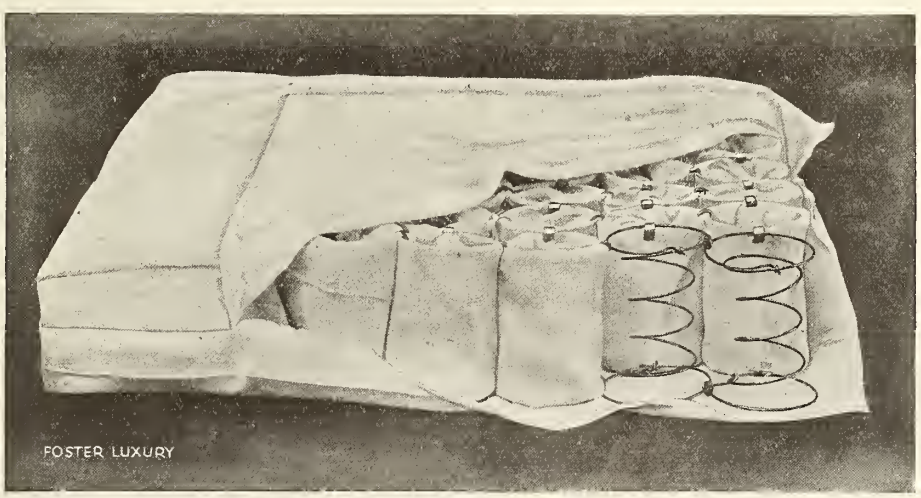
This filling is known as the "Luxury Spring," and is manufactured by the Foster Brothers Manufacturing Company, of Utica, N.Y. The springs, which are of the double cone type, are made of specially-tempered wire, and each spring is encased in a separate muslin sleeve. This latter feature makes the construction noiseless. The springs are attached to each other with metallic clips and the ends of each spring are knotted, to prevent them working into the sleeve.

The three principal features of the "Luxury Spring," as pointed out by the manufacturers, are resiliency, freedom of action, and durability. The muslin sleeves prevent rubbing of the coils, while the metallic clips that hold the coils in place prevent undue wear on the sleeves. The outside muslin cover keeps the filling from working in around the springs. Fillings can be obtained in various heights and sizes and gauges of wire.

The safe and successful finish is the result of honestly doing the thing to be done, no matter what it may be.

The best way to succeed in this world is to act on the advice you give to others.

Look to the condition of your varnish materials often. You will be amply repaid for your trouble.



The "Luxury" Spring Filling.

"Safety First" Department

What to Do for the Belt

Slipping due to a belt not being able to pull its cut means waste power and loss of production. If the cut be heavy enough, the maximum slip will be reached when the machine is stalled, the power input remaining approximately the same, the loss being entirely one of friction due to slip on the belt. A familiar illustration of the above is that of an operator decreasing the depth of the cut on account of slow down, because the belt will not carry the load.

Whenever the belt does not pull, the size of the belt must be increased. However, this does not cover all cases, for there are numerous instances where there either is not room to increase the width of the belt or if step cones be used the number of steps will have decreased. Changes in sizes of pulleys will frequently assist in such cases.

When the belting is dry the surface dirt should be removed by a cloth dampened with kerosene or by a scraper. A light dressing may next be applied to both sides. After this has worked in, the dressings should be repeated until the belt is "mellow," but not greasy. Be careful of the use of sticky belt dressings. They are liable to stick the belt so tightly to the pulley that the grain is pulled off the belt. They also shorten belt life by rotting it. Much oil is injurious to leather. Besides, rotting machine oil causes excessive slipping. When oil soaks into the belt laps it tends to loosen them, so that the laps start up at the points. This may also occur from running the belt in the wrong direction.

Belts used on main drives should be able to transmit about 5 per cent. more power than needed, while machine belts should have 25 per cent. excess capacity. Belts should always be narrower than the width of the pulley face, as any misalignment may cause rubbing, which would result in loss of power and a damaged belt.

Belts should get a mechanical grip of the pulleys they run on.

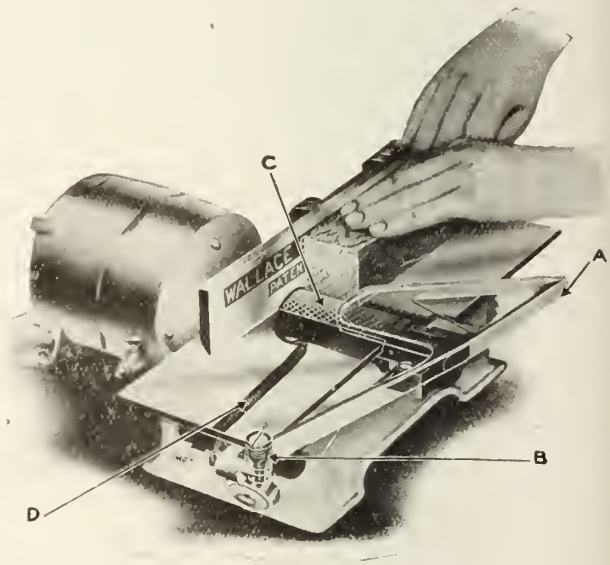
Avoid running belts too tightly, as great tension shortens the life of the belt, occasions a waste of power, and causes great inconvenience from hot boxes, broken pulleys, and sprung shafting.—Hardwood Record.

Guard for Wallace Bench Planer

The growing demand for safety devices on woodworking machinery emphasizes the necessity for attention to this detail by machinery manufacturers. As a general thing woodworking machines are put on the market without safety devices, and the user is often left at the mercy of makers of inefficient guards.

The makers of the Wallace bench planer are anticipating the demand that will be made in the near future for "built-in" safety devices, and are equipping their machines with guards before they leave the factory. In the accompanying illustration showing the flap and shutter-guard, as applied to the Wallace bench planer, the flap A is an aluminum casting swinging over the tables; it is held against the stock by the flap spring B, so that the unused part of the knife is covered. When special work, such as rabbitting, is done the flap can be swung off of the machine, out of the way.

The shutter C is a part of a steel tube which slides in grooves in the frame concentric with and surrounding the cutter head, entirely covering the throat opening. The lip of the shutter rests on top of the front table, being held by the shutter spring D until it is pushed by the stock around under the rear table. When the cut is finished the shutter is snapped back over the throat opening. The makers of this guard claim that in case of a "kick-back" the stock draws back the shutter with it, this action automatically



Built-in guard on Wallace Bench Planer.

eliminating the possibility of nearly every planer accident.

This device is made exclusively for the Wallace bench planer by J. D. Wallace & Co., 1402 West Jackson Boulevard, Chicago, Ill. Employers who are interested in securing perfect safety can get full particulars by writing to the above address.

Capacity of Coal Bunker

Multiply the length, breadth, and height together. Divide the result by the number of cubic feet per ton of coal; a ton of coal occupies approximately 42 cubic feet of space.

Boilers newly set should be heated up very slowly.

A workman can never find fault with a good tool, no matter whether he is a first-class mechanic or not.

Men cannot work to advantage with an inadequate outfit of tools. Good profits, otherwise saved, are lost by such a practice.

A good workman will make so few errors that he can well afford to admit them, while the worthless man is easily found out, for his faults will be many and apparent.

Efficiency and Production in the Factory

In an address delivered before the Southern Furniture Manufacturers' Association, Wm. H. Gehm enumerated the twelve basic principles of factory efficiency as follows: —Ideals; common sense and judgment; competent counsel; discipline; fair dealing; reliable, immediate and accurate records; planning and despatching; standards and schedules; standardized conditions; standardized operations; written standard practical instructions; efficiency reward.

Continuing Mr. Gehm said: The modern executive is continually, unceasingly studying, analyzing and observing. When the lumber is purchased, not because it is the cheapest per one thousand feet, but because it has been tested and accurately determined that for your individual plant needs, it is the cheapest per usable foot.

The lumber should be graded properly and the grade so planned that it will go through kiln to make certain parts of the unit. In many cases common No. 1-2-3 are all placed on the same kiln car, intermingled, shoved through the kiln to cutters, there to stop production, while the cutter sorts the lumber for the usable and consigning lumber that would answer other purposes to the wood box.

Our next step is the kiln, or drying process, the basic and most important step in this industry. If your basis is not correct the finished product is not correct. Six rules for operating the dry kiln are:

1. Estimate from previous experience the length of time the stock is to be left in the kiln.

2. Divide the time into three parts.

3. During the primary period, keep your temperature at a low point and your humidity high, and do not attempt to do any drying.

4. During the intermediate period increase the temperature gradually and decrease humidity and allow the drying to begin.

5. During the final period, other things being equal, the drying may be rushed forward without danger and completed in quick time.

6. Keep a careful record of how you dry each kilnful of stock, to guide you in future procedure.

Unknown and unscientific kiln conditions produce great losses, such as losses of dimensions, hollow horning, case hardening, surface checking, etc.

The process of drying may be summed up in three words—steaming, sweating and drying. Subject the lumber to the action of warm air at or near the vapor saturation point, until it is thoroughly softened and expanded. Then, while at full expansion, with pores wide open and sap canals open, gradually evaporate the moisture from the interior through the open of the surface, and continue the drying process from this point by gradually decreasing humidity and increasing the heat until the lumber is dried down to the requisite condition, generally to a moisture content of five per cent. over bone dry condition. Then do not guess at this moisture content, but determine it accurately by testing the top, centre and bottom of each kiln car. After the car is pulled from the kiln, do not put it into work immediately. It is hot and has not adjusted itself to atmospheric conditions; allow it to temper from three to four days before the cutter runs a saw into it.

The Machine Department

The second basic step is the machine department. There are a number of methods used in billing into this department, but if your billing system does not inform the cutter whether the part he is cutting must be good on one, two, three or four sides—what machine it is to go to next, and the next operator what to do with it; and in turn where it goes to next, and that next operator what to do with it, and so on, so that you know the piece is accurately and completely machined when it reaches your cabinet department—if your billing system does not do this, I contend it is incomplete.

Most of you have experienced the difficulty in getting all parts into the cabinet department ready and complete for assembly. If the job is not complete time is lost in hunting missing parts, schedules and plans become interrupted. A simple system of planning so as to determine accurately what parts are in each department will solve this condition. The planning system can be studied out to fit your individual plant needs.

Great stress should be placed on accuracy in machining. Your working system should provide a check on accuracy.

Time will not permit taking up each department; suffice it to say that there is no royal road to efficiency. Make the narrow lane of efficiency a wide gauged road through your plant from yard to customer, and it will pave itself with profits.

For a few moments I wish to discuss the labor equation. It is absolutely essential that wage systems other than the day work be established in every department.

Wage Systems

Operating under the day-work plan or wage system, the employee is paid for the time he spends upon his work, but the length of this time is never definitely stated. As a result of this system, an easy rate of speed is generally taken. Workmen have little interest in their work, and the employer overpays.

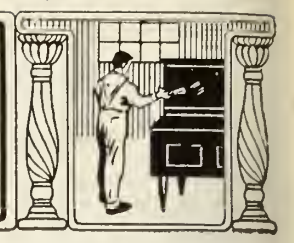
Under the modern system of piece work, bonus or any modification of these systems, each operation is studied and analyzed, the fastest and best method is determined, then a time and motion study is made, taking into consideration the following variables:

Size of unit handled.
Weight of unit handled.
Method of handling.
Position of unit handled.
Length of travel.
Position of worker.
Rapidity of motion.
Exertion called for.
Facilities furnished.
Rest and fatigue of worker.

A price is then established, and cannot be changed by the management unless the design or method of doing the work is changed. Now, we are able to say to the worker, we will pay you a certain definite amount of wage if you return us a certain definite amount of activity. There is now an incentive for the worker—proportionately as his activity, both physical and mental, increases his wage increases.

Many times after I have installed a modern wage system, the workmen who had been receiving most under the day-work system fell far below wages under the more modern system, and the worker that had received least now outstripped his previously better paid companion. Every department of the furniture industry is amenable to a modern wage system.

THE FINISHING ROOM



The Proper Way to Cut Shellac

By Finisher

Either grain alcohol, denatured alcohol, or wood alcohol will properly cut orange shellac if properly used. It may be of interest, however, to go into the matter in detail.

tity has, at some time on opening a bale of gum, found quantities of the shell firmly cemented together. This is caused by heat. These shells are sometimes so firmly cemented together that considerable force is required to pulverize the mass. When shellac is in this condition the gum should be pulverized, or at least the shell separated sufficiently to allow the solvent to circulate freely among the particles.

When the gum has been properly pulverized or reduced to loose shell form, the method of procedure is as follows: Measure into a vessel the amount of solvent for the gum, pour the gum into the solvent, and stir at intervals of two or three minutes, until the whole is dissolved. This is where a great many finishers get into trouble. They put the solvent and the gum together and neglect to stir to prevent settling.

The result is that the gum falls to the bottom, and, being unable to obtain liquid enough to form a solution, it becomes the thick, gummy mass which is the cause of complaints. Apart from this trouble, the finisher should experience little or no difficulty in dissolving orange shellac.

White and bleached shellac are different. There are times when these will not dissolve in the ordinary solvents, and the only thing to do is to send them back to the factory. The cause of this trouble is to be found in the bleaching process. The chemicals used in the bleaching process must be thoroughly washed out, or their continued action on the shellac renders it practically insoluble. It can be dissolved by the use of an agitator, but when this method is utilized dissolution is not complete.

The gum is broken up into small particles instead of being liquified. Shellac of this kind is unfit for use, and under no circumstances should it be used on highly colored woods like mahogany or walnut. It is certain to produce a cloudy effect sooner or later.

It is not always advisable to use as a solvent the liquid that will dissolve the shellac the quickest. There are numerous solvents on the market that will cut shellac quicker than alcohol will, but shellac cut with most of them usually works hard, and a saving in price is often lost in the extra time required to apply the shellac.

Chair Chat on Special Finishes

By the Chair Man

Any dealer who objects to paying an extra charge for special finishes when ordering furniture fails to appreciate the reasons which compel the manufacturer to levy a nominal amount for such additional service.

Take, for example, an average experience in a chair factory. When a quantity of a certain design of diners is assembled in the cabinet department, a portion is designated to be "reserved in the white." That means that the inspector must set out of the whole lot whatever amount is specified, and such selection must be of uniform grain and color in order that the special shades of finish can be produced to the very best advantage. That takes extra pains and time on the part of the inspector which might be employed otherwise.

Sufficient space in the stock-room must be set aside to store the white stock, and, as with most factories, the floor space is all too limited for finished chairs. Imagine the extra handling required to place white stock until it is ordered passed into the finishing department.

Where a steady stream of chairs is passing through the finishing processes, all being treated alike and with the same materials, certain costs can be obtained. A manufacturer, knowing from experience that a given percentage of an oak chair will be wanted in standard golden, and another percentage is required finished in standard fumed, can make calculations on that basis and give instructions accordingly.

When a dealer specifies a set of diners finished to match a shade of interior trim other than a standard color, the special order entailed in the factory is an added burden to the production. If there is stock put up in white of that pattern of diner, a set is passed into the finishing-room. The foreman proceeds to prepare the materials which will produce a duplicate to the sample submitted by the customer (usually it is of a wood other than that of which the chairs are made), and frequently tests have to be made before the foreman is satisfied he has the correct formula. It is impossible to estimate the time such expert work will require.

As the set of diners evolves through the different stages of finishing, upholstering, and packing, care must be exercised to keep the set intact and not confuse with other finishes. Such attention means time of foremen and office help to a degree that is difficult to compute.

The demands on factories for special finish have increased steadily the last few years to the point where the provision to handle such orders imposes cost to factories that fully justifies whatever extra charge is made by many.

Remember that the small surfaces of chairs with the large amount of end grain exposed makes it extremely difficult to mach up with the veneer fronts of case work. Most finishing foremen of chair factories who are artists at matching colors are born and not made.—Furniture Manufacturer and Artisan.

Bad finishing is often a matter of bad brushes—brushes that have not been taken care of properly. Twisted bristles and misshapen ends will make the best material cover poorly, and always deface the surface with brushmarks.

The selection and installation of equipment for the transmission of power is a matter calling for good judgment and engineering skill.

"Hear the Trade Talk"

Hearken to the demand of your dealers; for their interest is yours

They want you, Mr. Manufacturer, to put your best . . . licks on the finish of your . . product. It helps them . . . sell more; and makes them buy more from you.

Many of them would be more specific and say, "Finish with

Spartan Art Wood Stains

– the goods that improve all woods."

We only claim expertness in one job, making finishing goods for the piano, furniture, and architectural trades.

Ask any well informed manufacturer or finisher; or write to us for sample panels.

The Marietta Paint & Color Co.
Marietta, Ohio.

MARIETTA WOOD FINISH SPECIALISTS

SPARTAN ART WOOD STAINS
MANUFACTURED BY THE MARIETTA PAINT & COLOR CO. MARIETTA-OHIO

Varnish and Other Materials Advance in Price

One of the largest retail furniture dealers in the South wrote to one of the largest furniture manufacturers in the South, says the Southern Furniture Journal, asking the whys and wherefores of advanced prices. The manufacturer attributed them to increased cost of production, and thus explained:

"Of course lumber is the principal thing in furniture and a larger percentage of the cost than anything else, with labor and mirrors coming next, mirrors applying to case goods only.

"Our lumber people are asking to-day $24 for No. 2 common, wormy chestnut that we bought last year for $16 and two years ago at $14. No. 1 common oak is quoted at $37 to $40, and we bought it a year ago at $32. Oak has not advanced as much as other kinds of lumber. Mahogany lumber was priced to us the other day at $220; stock that we weer buying a few months ago for $160. Mahogany veneers are 2 cents a foot, 1/28 inch stock, and we bought a yea rago 1/20 stock for about 1½ cents. One-quarter drawer bottom veneers are $14.50; were a year ago about $10 to $10.50. They are asking to-day $5 for 1/20 poplar or gum veneers that we bought a year ago for $3.50. For gum lumber they are demanding $36 to $40 a thousand; No. 1 common red, which we bought in December for $30, and had a great many cars shipped out in January and February at that price. We bought 2-inch quartered red gum last year for $46, and they are now asking anywhere from $63 to $70, and it is very hard to get.

"Mirrors advanced every month or so last year, and we had about a 12 per cent. advance January 1. Mirrors cost twice as much as a year ago.

"It is needless for us to say anything of the labor conditions, as you know perhaps as much about this as we do. Skilled labor is very hard to get, especially cabinet men and good machine men. We are paying our cabinet men—some of them—to-day from $18 to $25 a week that were paid twelve months ago $13.50 a week, and theer is no telling what labor will be when the young men are called t othe colors and the government gets down in real earnest to shipbuilding and things of that kind.

"Brass goods have advanced over 25 per cent. and up as high as 100 per cent. Varnish has advanced from about $1.75 a gallon to $2.25, and the cheaper grades in proportion; but the quality of the varnish is not nearly so good, except in the better grades, where we pay the price. Shellac that we paid $1.20 to $1.30 for is now $2.50 and $2.60, and, of course, stains and colors are simply out of sight. Mirrors which we bought for 5 per cent cash or four months' note—the usual terms—are now 3 per cent. cash or sixty-day note. We formerly bought glue, taking three barrels a week and using as much as 60,000 pounds a year, at 11 cents—or a year ago at 12 cents, 2 per cent. cash or ninety-day note; to-day they are asking 38 to 42 cents for this same glue, terms strictly net cash and no discount. Sandpaper we bought a year ago at list prices less 30 and 10 per cent., and to-day we are paying list prices plus 20 per cent., or an advance of 100 per cent., net cash thirty days and no discount.

"The glue factories close down in April and do not start up until September, and prices are jumping on glue and paper, with indikcations that we will be unable to get them at any price. But for the vegetable glue which we are using we do not know what the manufacturers would do. You can figure the cost of glue at an advance of 28 cents a pound for 50,000 pounds a year for a ilttle concern like ours. Fortunately we put in equipment two years ago for using vegetable glue, and we are perhaps the only furniture manufacturer in the South who has an old contract.

"For our crating lumber, of which we use a great deal, we formerly paid $8.50, and this now costs us $13 and $14. In addition to all these things, we are finding it very difficult to get deliveries on supplies, materials, lumber and everything else, and in many cases we have to pay the cash in order to get shipments. In no instance can the furnituer manufacturers get dating on anything in the world that he buys, and the manufacturers and jobbers would simply laugh at us if we said anything about dating.

"Every week, of course, our labor has to be paid in cash; we pay on Friday for the preceding week, and our factory payroll runs from $1,300 to $1,600 a week. Our coal is costing us to-day $3.25 a ton, run of mines at the mine; up to April it cost us $1.25, an advance that means $2,000 more for coal for us. The railroads have demanded an increase in freight of about 15 per cent., and will no doubt get it; and this alone will mean a good many thousand dollars from our concern for the year.

"Temporarily the furniture businness is quiet, though we have more orders than ever before in dollars and cents at this time of the year, having several large hotel contracts. eWe are declining future orders, refusing yesterday to quote on a contract for delivery October 1. We are not buying ourselves in anticipation to an ylarge extent, and we think it would be unwise for dealers, especially installment dealers, who are not financially strong to buy heavily; but unquestionably prices are going to be higher, or else the furniture manufacturers cannot pay their bills. These are the facts as they are and as we see them."

Shaping Swags

There is a simple and absolutely true method of shaping swags for painting friezes. Procure a length of common chain—a dog chain, or a yard or two of plain brass chain. Drive in a couple of needle-points at the points of suspension, and loop the chain over them at any length required, and the line taken by the chain will be a correct swag.

By using a longer or shorter chain—i.e., by taking up links on the needle-points — the centre line and upper and lower lines of a festoon may be made of any thickness.

The writer borrowed this idea from a very clever Italian artist who was painting exactly such a frieze in a house in the west end of London in 1872, and he has used the same bit of chain ever since, times without number.—Decorators' and Painters' Magazine.

Table Top Marred by Heat

No French or other polish will stand hot dishes without marking. All polishes and varnishes are affected by heat. If hot dishes must be used without the interposition of a thick baize and cane or other dinner mats, the only course to adopt is to merely oil the top.

To re-polish, remove all the old polish with ammonia, wash with vinegar, scrape if necessary with a cabinetmaker's scraper, to get a fine, new surface, and body in and polish in the usual way.

Practical—reliable AERON SYSTEM Equipment for Every Spraying Need

Aeron Finishing System — Surpasses Brushing

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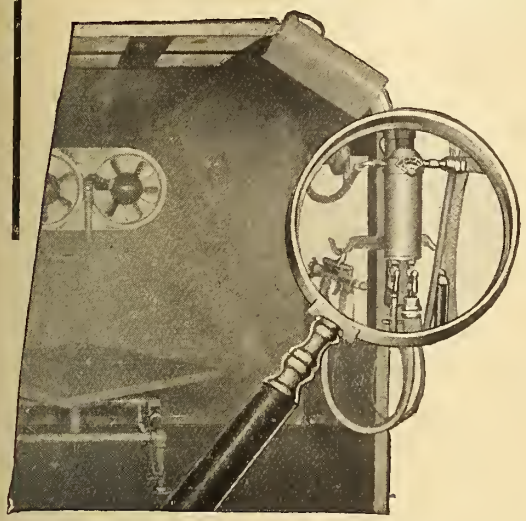
—Stationary Type EF—

A "different" type of Heater THAT HEATS the varnish or material and the air, and keeps them heated sufficiently to insure the last word in a perfect spray finish at all times and under varying conditions.



Picturing the stationary Type EF Electric Heater and how it is attached to Air Transformer Set—the nearest possible point to the nozzle without being attached to the Aeron.

Practical—Indestructible
Burn-out-proof—Fool-proof

The stationary Type EF Electric Heater is located at the nearest possible point to the spray nozzle without being attached to the Aeron itself.

Both the varnish and the air pass through the Heater, and from this "close-up" point of connection reach the work properly heated and so directly and quickly that perfect results are always a certainty. Pitted and pebbled effects are entirely eliminated.

Type EF Electric Heater has a variable heat, 3-point switch, allowing for three different temperatures to meet every working condition. It is operated from the ordinary electric light connection—consumes an extremely small amount of current—requires no special wiring—insures greatest efficiency at least cost.

There is nothing delicate nor complicated about the EF Electric Heater to give out and require expert attention. It is built reliably throughout, is guaranteed against burning out, and to stand up in service. That it is practical, indestructible, fool-proof and will out-perform any other such heating arrangement, has been definitely demonstrated in every possible way.

A Type EF Electric Heater will be SENT ON TRIAL to You, if an Aeron User—

All we wish to know is your willingness to have it sent on and your current voltage. . . . If you are not using the AERON SYSTEM, we shall be glad to tell you about its complete advantages and economies as applied to your own work, and explain our special trial plan—ADDRESS—

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You want your goods to compete with others—you want your share of the business. Why not give us an opportunity to serve you, with the chemical knowledge and years of experience? We feel that we can supply it, to your advantage.

Walter K. Schmidt Co.

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Colors for Graining

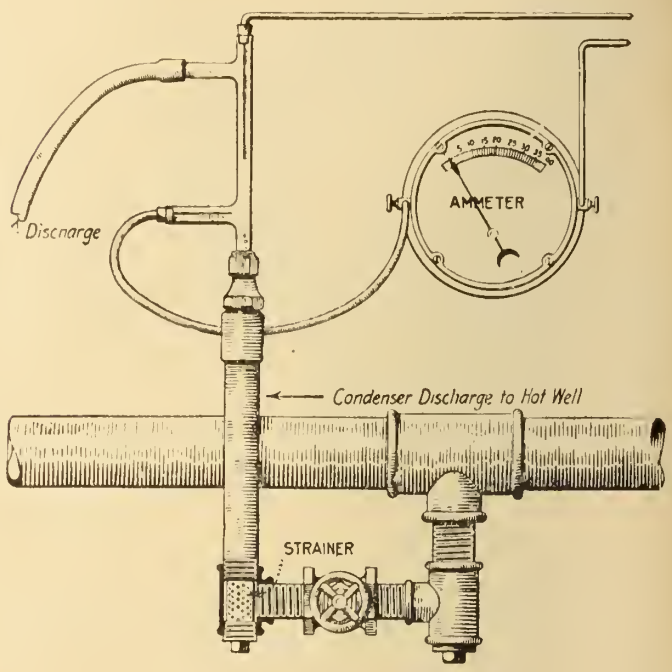
For ordinary graining the advantage of using the ready mixed colors is that being ready mixed and very finely ground, they save a great deal of time and permit of good results. The best grainer in the world cannot obtain a good imitation of a wood if he uses coarsely ground color. It is, however, in the production of "brush graining" effects that these specialties have proved so popular; in fact, it was because of the success met with in that direction that they have come to the front. To take a simple example of the use of colors for this purpose. A white ground is prepared in the ordinary way, and upon it is given a coat of very dark brown or black scumble color. While wet this coat is brush grained by being "flogged" with a grainer's flogging brush or a nearly dry brush drawn over its surface. This removes a portion of the black in hair-like lines, exposing the white beneath, and the result is an exceedingly pleasing grey effect. By varying the color of the ground and the graining color an infinite number of different effects may be produced. No attempt is made to imitate any particular wood excepting so far as color is concerned. The markings are wholly dispensed with, hence from an artistic point of view there can be no objection to this method, which makes no pretence to be anything but what it is. The cost is very moderate, considerably less than ordinary graining, and the effect for dining rooms, board rooms, offices and apartments of the kind is both solid and dignified. The work may be finished either with a glossy varnish or with one or more coats of rubbing varnish, each being rubbed down as already described, and this method will usually be found preferable. Or by way of variation the panels may be rubbed down and the stiles and rails left glossy.

Some excellent effects too may be produced by using rich colors on hard woods. For example, oak, pitch pine, etc., may be colored a rich deep blue, green or red where the color harmonizes with the general scheme of decoration.—The Builder.

A Salinity Indicator

I, as well as other engineers, have had more or less trouble on account of salt water getting into the boilers owing to leaky condenser tubes, and they are not always discovered until the water is pretty bad, particularly when the load is heavy. Of course, in a great many plants chemical tests are made at regular intervals to determine the condition of the condensate at that particular moment, but for many reasons this method is not reliable.

I have devised an apparatus which gives entire satisfaction, besides saving considerable time and expense. We have 440-volt a.c. current available, so a transformer was made by our chief electrician, to give a maximum range of 600 volts. A meter was purchased at small expense and connected up with the arrangement of piping, etc., as shown in the illustration.



To test water for salt.

With this rig the condition of the water is constantly under observation, as the circulation through the glass tube permits of a continuous change of water. When first placed in use, different amounts of sea water were put into the condenser discharge and chemical tests were made and meter readings taken simultaneously, and the meter was checked accordingly, so that no other readings or computations were necessary.—F. G. Seaver, in Power.

It is not to be expected that a man can understand finishing in a few weeks. It requires many years of experience and study to acquire even a fair knowledge of what finishing really is—or ought to be.

Peter Hay Machine Knives

Peter Hay knives are made of special quality steel tempered and toughened to take and hold a keen cutting edge. Hay knives are made for all purposes.

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Made in Canada

The Peter Hay Knife Co., Limited

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"ENAMELS"

Our business in both White and Old Ivory Enamels and Primers has trebled during the past year

WHY?

They are the best on the market. If you are not using them, write for samples and prices.

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Veneers and Panels

How to Order Veneer and Built-up Stock*

Although built-up or veneered lumber has been in use for many years, and I believe was first manufactured in Europe, yet there are many persons to-day who are not familiar with the many ways in which it can be utilized.

This article is, therefore, written for the benefit of the uninitiated, as well as the manufacturer or dealer, who is frequently embarrassed because his client does not make his wants clear when ordering, and in this way a great deal of valuable time is lost through correspondence. Most consumers do not appreciate how much time is required for the successful output of this product, referring, of course, to veneered stock used in high-class furniture.

In other words, six to eight weeks should be allowed for the preparation of dependable stock, which can be easily arranged if the consumer will make out his requisition for panels, etc., at the time he issues instructions to his superintendent for the next cutting. In many instances this is overlooked, and in that event the panel manufacturer is depended upon to come to the rescue, which frequently results in errors and poorly manufactured goods being turned out.

Unfortunately, there are no established grading rules by which one might be governed, and which makes it all the more difficult to execute such orders intelligently. There is urgent need for the establishment of grading rules for built-up stock, as well as veneer in general, and I, therefore, recommend that this association take up the subject without further delay, and, if possible, do so at this session.

Too much stress cannot be laid upon this subject, when it is considered from various angles, especially as it relates to miscut stock, due to improper specifications, which results in stock being rejected, and which is frequently a total loss to the panel or veneer manufacturer. If difficulties of this character can be overcome or minimized it would have a consequent effect on prices.

It might be well to refer to the different kinds of woods in use in the construction of built-up stock, referring more particularly to the surface veneer, beginning with American walnut, which is known as sliced or rotary cut. Sliced walnut is a straight cut through the log, which sometimes produces a striped or mottled effect, while rotary cut is produced on a veneer lathe, the log revolving, and the veneer cut from the outer surface.

Oak, white or red, is quarter-sawed or sliced, and also rotary cut.

Mahogany is usually sliced, and bears either a mottled, striped, or plain appearance.

Quartered gum, sometimes called figured gum, is also sliced. In some cases the use of sap is permissible and should be so noted. I am not referring to veneer generally used in the construction of furniture.

The following woods are usually rotary cut, namely: Poplar, bird's-eye and plain maple, birch, red or unselected for color, ash, elm, red gum and gum unselected for color, basswood, cottonwood, sycamore, and yellow pine. This does not include such woods as fir, white pine, bay poplar, and others in which this association is not vitally interested.

We will next discuss grades. This is of paramount importance in the fixing of values, for instance, where the articles are to be used for cheap furniture, and the grade is not to be an important feature, which would enable the manufacturer to make a price commensurate with the quality of the panel. In other words, where operations such as the jointing of cores or centres, drying out of panels, smooth sanding, matching, etc., can be eliminated, the price of the stock will necessarily be lower.

The next and most essential thing is to state for what purpose the stock is to be used, namely, tops, fronts, side panels, backs, bottoms, etc. If matching or centre joints are required it should be so stated.

The next factor is dimensions. The length is always determined by the way the outer veneer runs and the width across the grain. By following this rule errors will be avoided. The exact thickness should also be given if necessary. Some persons have an idea that the number of ply indicates thickness.

For the convenience of the customer I would suggest that he give catalogue number for each item. In special cases, as relates to butt or mitre joint, I would recommend that the customer furnish a sketch or some sort of diagram showing just how the stock is to be constructed.

The character of the veneer, especially as relates to figured woods, such as mahogany and walnut, must be clearly specified or samples submitted.

Where the consumer does re-sanding it should be made known, so that the panel manufacturer can reserve as much of the surface veneer as possible. This applies especially to mahogany which "furs up" after it has been stained.

Built-up stock is made in the following thicknesses: 1/8 in., 3/16 in., 1/4 in., 5/16 in., 3/8 in., 1/2 in., 5/8 in., 3/4 in., 7/8 in., 1 in., 1 1/4 in., 1 3/8 in., 1 1/2 in. There are also intermediate thicknesses, but the foregoing are standard.

In panel work, that is to say, 5/8 in. and less in thickness, rotary cut stock is used for coring or centres. If a lumber core is required in stock 5/8 in. thick or over, it should be so stated. For the best construction five-ply is recommended, especially in panels 3/8 in. or greater in thickness.

* The above paper on the ordering of built-up panels and veneer stock was read before the National Veneer and Panel Manufacturers' Association, Chicago, June 12, 1917.

Strength of Rotary Veneer

There is one point about rotary-cut veneer that the manufacturers of this product might make something more of in the way of an advertising feature than is being made of it, and that is the greater strength which is secured by peeling stock around the log.

In practically all woods the resistance to bending is much greater radially than tangentially. In other words, rotary-cut stock is much stiffer, has a greater strength and resistance to bending than quarter-cut or than plain-sawed lumber.

Fig. 1—Pile of oak veneer at Toronto Veneer Company's warerooms.

It would be interesting to have a series of tests that would furnish specific data on this point. What experiments have been conducted show very plainly that wood is stiffest when cut the way rotary veneer is cut. And not only is a rotary-cut sheet of veneer stiffer than a piece of sawed veneer, quartered or cut at some angle, but three-ply, built up of rotary-cut veneer, is stiffer than a three-ply panel built of any other stock.

This factor of strength is one that should be receiving much more attention than it has been getting. We might well have something of the same series of strength tests made upon panels that have in the past been made by the forest service upon structural timber and lumber, and get from this some interesting data to promote the use of veneer and built-up work.—Veneers.

Toronto Veneer Company's Warehouse

The photographs appearing on this page show part of the large stock of veneers carried by the Toronto Veneer Company at their warehouse, 93-99 Spadina Avenue, Toronto. This company has only been in business for about 1½ years, but they are already well known to the Canadian trade. Through their aggressive selling methods and the service which they extend to their customers they have built up an extensive business. A great many manufacturers appreciate the fact that they can call at the company's office and examine samples and leave orders for their veneer and have it delivered without delay. Special care is taken in the filling of telegraph, long distance phone, or mail orders.

The small illustration (Fig. 1) shows a stack of oak veneer in the company's warehouse. This oak comprises sliced and split stock, in widths and lengths to suit almost any purpose. The larger illustration (Fig. 2) is a general view of the warerooms, showing the large quantity of walnut, mahogany, and poplar veneer and poplar cross-banding, etc., carried in stock.

Built-up Tops Should be Five-ply

There is no doubt but that built-up tops are the best if properly prepared before being glued up. If work is properly done, and a good glue used, there is no doubt about a top of this kind standing better than a solid top.

When the finisher, on the lookout for a certain good thing, buys material that exceeds his expectations in quality, be sure the manufacturer has made a friend of him.

Fig. 2—Showing part of the large stock of veneer carried by the Toronto Veneer Company at their warehouse, 93-99 Spadina Avenue, Toronto.

OAK MAHOGANY CIRCASSIAN MAPLE

VENEERS

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We always carry a large and assorted stock of Mahogany, Circassian Walnut, Sawed and Sliced Quartered Oak.

Send us your enquiries and orders. We guarantee good service.

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Quartered Oak Veneers

From Northern Grown Trees

Our policy is "Honest inspection, intelligent selection. With fifty years' experience we are able to really live up to our policy.

"H.B" quartered white oak veneers are recognized as the standard of fine veneers.

Northern grown trees are used exclusively in the manufacture of **"H.B."** veneers.

Ask us for prices

Reg. U.S. Pat. Office
Established 1867 Incorporated 1904

Hoffman Brothers Co.

800 West Main St., Fort Wayne, Ind.

WE SPECIALIZE ON—

POPLAR CROSS-BANDING AND BACKING VENEER

Highest Grade — Right Prices

The Largest Poplar Veneer Mill in the World

THE CENTRAL VENEER CO., HUNTINGTON, WEST VIRGINIA

Removing Hard Glue from Panels

When thin veneer, especially mahogany, is applied to irregular surfaces by means of cauls, under great pressure, the glue sometimes forces its way through. To remove these occasional patches of glue after they have become hardened and fastened to the delicate veneer is a problem that bothers some men a great deal. The lumps of glue cannot be removed with a sharp tool without scoring or pulling out the delicate veneer, and to sand them out is unsatisfactory, because one will invariably sand through where the veneer is clean.

The method practised in some piano factories is to wash them off quickly with hot water (the hotter the better) as they are taken from the cauls. The surfaces must, of course, be dried quickly, too, by wiping with dry shavings and sawdust. A man accustomed to this sort of work will clean every piece perfectly without harm or danger to the delicate veneer.—Veneers.

Basswood Does Not Warp

The American Exporter of December calls attention to the fact that nearly 90 per cent. of the wooden toys being made in the United States are carved or turned from basswood. The number of such American-made toys has grown enormously since the beginning of the European war. The Exporter regards basswood as especially workable as compared with other woods, particularly when heads and faces are carved.

One other point in favor of basswood is overlooked. This is its unusual elasticity. A top needs to be elastic to prevent its breaking too quickly. It will break soon enough, anyway, but if it has no rebound, its quick fate results in the parents' avoiding articles of the same material the next time.

Elasticity of Basswood

The elasticity of basswood is so marked that the Icy-Hot Bottle Company of Cincinnati, after long testing of various woods, chose it as the best material for carrying cases. Such cases, which are used mostly by sportsmen, contain a vacuum bottle and a lunch. The case is so often exposed to rain and snow that if made of poorly-chosen wood it would keep its shape but a short time. Basswood, however, is found to be almost entirely free from warpage—a proof of its elasticity and durability. It is found by the Icy-Hot Bottle Company that basswood is one of the clearest and cleanest of woods and especially free from knots and flaws.

In 1914 the toy-makers in the United States used 30,000,000 feet of lumber, and of this amount 27,000,000 feet were basswood.

The manufacturers of gum lumber publish a house organ, in which they print a number of formulas for finishing gum lumber, which should be of interest to the makers of furniture who are making more and more use of gum in furniture making.

The best tools and brushes are the cheapest for the firm, for the foreman, for the work, and for the workman. You get better results, waste less material, and save more trouble than by using the cheap things that are sold on every hand.

A Rush Order for an Important Customer —and you're short in the VENEERS he wants

It has happened and may happen again, to you—to every manufacturer. But don't let it worry you. We can fix you up in double-quick time. We always carry a large stock of Mahogany, American Walnut, Quartered Oak, Figured Quartered Gum and Rotary Cut Veneers in Poplar, Maple, Oak, Gum and Birch, at our warerooms, and can ship immediately from stock. Special care given all orders. Wire or phone your rush orders. Write for those you are not in such a hurry for. Drop in and see us when in town and choose your own stocks.

WHEN YOU'RE IN A HURRY

TORONTO VENEER COMPANY

TORONTO 93-99 Spadina Ave. ONTARIO

OAK MAHOGANY CIRCASSIAN MAPLE

VENEERS

BIRCH POPLAR CHERRY WALNUT GUM

Wood - Mosaic Co.

NEW ALBANY, - - IND.

WALNUT

Lumber — Dimensions — Veneers

If you are in the market for anything in Walnut, let us figure with you. We have cut three million feet of Walnut in the last year, and have a good stock of all thicknesses dry. We can also furnish Walnut dimension—**Walnut Veneers.** We have a large stock of veneers, plain, stripe figured and stump wood.

Wood-Mosaic Co., Inc.

NEW ALBANY, - - IND.

K QUALITY

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K QUALITY

Write for prices on all

Plain and Fancy Lumbers and Veneers

Mahogany, Oak, Birch, Walnut, Ash, Poplar, etc., rotary, sliced or sawed in all thicknesses

Your Patronage Respectfully Solicited

Prompt attention given to all enquiries, and SAMPLES SENT IMMEDIATELY ON REQUEST, or representative will call.

George Kersley

224 St. James Street, Montreal

K QUALITY

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American Walnut Veneers

A larger and better assortment of AMERICAN WALNUT VENEERS in Sliced, Half Round and Stump Wood than ever before offered.

Roberts Veneer Co., New Albany, Ind.

OAK MAHOGANY CIRCASSIAN MAPLE

VENEERS

BIRCH POPLAR CHERRY WALNUT GUM

Mahogany **Figured Red Gum**
American Walnut **Curly Birch**
Quartered White Oak
(Sawn or Slice Cut)
And all other kinds of

Domestic Veneer

AND

Thin Lumber

ACME VENEER & LUMBER CO.

8th, Harriet and 7th Streets - - - - CINCINNATI, Ohio

We can ship

IMMEDIATELY

2 cars of 1/20 in. Unsel. Gum Veneer.
4 cars of 1/4 in. Unsel. Gum Veneer.
3 cars of 1/8 in. Unsel. Birch Veneer.
2 cars of 1/16 and 1/8 in. Red Oak Veneer.
15 cars of Panels, 3/16 to 1/2 in., in various woods.

GEO. L. WAETJEN & CO.

MILWAUKEE - - - WISCONSIN

EMPIRE VENEER COMPANY, Inc.

Manufacturers of
Mahogany
American Walnut
Quartered Oak
and Other Fancy Cabinet Woods
Office and Show Rooms, 14 E. Jackson Blvd.
Chicago
JOHN D. LASKY, President
Write us for samples

Veneers and Panels

PANELS
Stock Sizes for Immediate Shipment. All Woods. All Thicknesses. 3 and 5 Ply or made to your specifications
VENEERS
5 Million feet for Immediate Shipment
Any Kind of Wood Any Thickness

We are Chicago agents for WOCO FIR PANELS, and carry a full and complete line in all stock sizes and all thicknesses at our Chicago warehouse for immediate shipment.

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1966-76 Maud Ave., - - CHICAGO, ILL.

BUYERS OF VENEERS AND PANELS

will find it to their advantage to purchase from the manufacturers and dealers whose advertisements appear in this publication. They are progressive firms—the leaders in the business, which is a guarantee of good service and prompt attention to orders.

Give your business to the man who will spend his time and money to get in touch with you. He deserves it—if his stock and prices are right.

OAK MAHOGANY CIRCASSIAN MAPLE

VENEERS

BIRCH POPLAR CHERRY WALNUT GUM

AT GRAND RAPIDS

READY TO SHIP

Poplar Crossbanding
Gum Veneers
Plain Oak
Quartered Oak
Mahogany

Immense Stocks — Right Prices
Write us

WALTER CLARK VENEER CO.
Grand Rapids

Indiana White Oak Lumber and Veneers

Band sawed from the best growth of timber.
We use only the best quality of Indiana White Oak.
From four to five million feet always on hand.

Walnut Lumber
Our stock assures you good service.

Chas. H. Barnaby, Greencastle, Indiana

The Glue Book

WHAT IT CONTAINS

Chapter 1—Historical Notes
Chapter 2—Manufacture of Glue
Chapter 3—Testing and Grading
Chapter 4—Methods in the Glue Room
Chapter 5—Glue Room Equipment
Chapter 6—Selection of Glue

PRICE 50 CENTS

Woodworker Publishing Co. Limited
345 Adelaide St. West, Toronto

The Lumber Market

Domestic Woods

Hardwood prices remain practically the same as last month, except that in some individual cases they fluctuate a dollar or two a thousand, depending largely on what stocks the seller has and how anxious the purchaser is to buy. There is very little change in the situation, except that stocks are continually going down. The demand from furniture manufacturers has dropped off slightly during the past two or three weeks. This is only expected to be temporary, however, the weather having considerably affected the sales of verandah and porch furniture. The fall demand for household furniture is expected to be quite good.

The other woodworking industries consuming hardwoods, such as implement manufacturers, railway car builders, etc., are taking large quantities of lumber, so that there is not much chance of prices falling off. With the softwoods the conditions are not much better. Planing mills, of course, are not doing their usual business owing to the lack of activity in the building trade, but box makers are buying large quantities of stock. These latter are willing to take any kind or grade of lumber that will make a fair-looking box. They have been using a great deal of merchantable and cull spruce. Prices on these woods are quoted at the present time as follows: Merchantable spruce—1 x 4, $31; 1 x 5, $32; 1 x 6, $34; 1 x 7, $35; 1 x 8, $36; 1 x 9, $37; 1 x 10, $38; 1 x 12, $38. Cull spruce—1 x 4 and up, $24. These are Toronto prices, and it will be noticed that they average from $8.50 to $10 per thousand higher than those of last year.

Box makers are also taking all the basswood they can secure, as basswood is a particularly good wood for box making. Nails can be driven quite close to the edge without any danger of splitting, and this is a feature to be considered in the box business. Pine and hemlock have almost ceased to be used in the box industry, as stocks have decreased and prices have advanced to such an extent that it is not profitable to use these woods.

The prices quoted at Toronto on hardwoods for carloads are as follows: White ash, firsts and seconds, 1½ and 2 in., $67 birch, firsts and seconds, inch, $50; basswood, firsts and second, inch, $50; soft elm, firsts and seconds, inch, $45; rock elm, firsts and seconds, 1½ and 2 inch, $55; soft maple, firsts and seconds, inch, $40; hard maple, firsts and seconds, inch, $43; Douglas fir, No. 1 and 2, 1 inch, clear, $50.75.

Imported Woods

So far there has been no slackening in the demand for hardwoods in the United States. The demand from certain sources, of course, is seasonably light, but this situation is more than offset by requirements, both direct and indirect, of the government. There is a general belief among lumbermen that next month is going to be the most opportune time for manufacturers to stock up for their winter requirements. In many sections an improvement in the car situation has occurred, but the supply remains unequal to transport all of the lumber sold to market or to get the needed logs to the mills.

Industrial plants are using a great deal of ash, hickory, and oak, as well as similar woods, and prices are accordingly high. Prices are firm on every soft and hardwood, and there have been some advances. Maple and beech flooring moved up $1 on July 2 on No. 1, while the factory grade of maple and beech flooring advanced $2.

Owing to the ideal weather conditions prevailing in the Southern States better progress is being made in getting timber out of the woods than at any other time since the high water of a few weeks ago. Notwithstanding the scarcity of labor and growing complaint on that score, logs are being cut and hauled in a more aggressive manner; and, while the supply is by no means large, the outlook for adequate stocks is brighter than for months. There has been very little change in the price of Southern hardwoods since last month. In individual cases advances of $1 or $2 a thousand have been made and paid by the consumer without protest.

According to the May cut and shipments compiled by the Northern Hemlock and Hardwood Manufacturers' Association, the production of hemlock is on the increase, while that of hardwood is on the decrease. Based on reports from 90 per cent. of the members, hemlock production for May was 5 per cent. more than in April. The amount of the hardwood cut, however, was 16 per cent. less.

The building trade in the United States has fallen off considerably, but the demand from the government for material for army camps, etc., is making up for the deficiency in this business. It is said that the sash and door requirements for the government are enormous, and large quantities of lumber are in demand. Prices are, however, firm, and likely to remain so.

Prices on some of the leading hardwoods in the Boston market are as follows: First and seconds inch basswood, $56 to $58; maple, $55 to $57; plain oak, $68 to $70; quartered oak, $90 to $95; red birch, $70 to $75; sap birch, $60 to $65; poplar, $68 to $70.

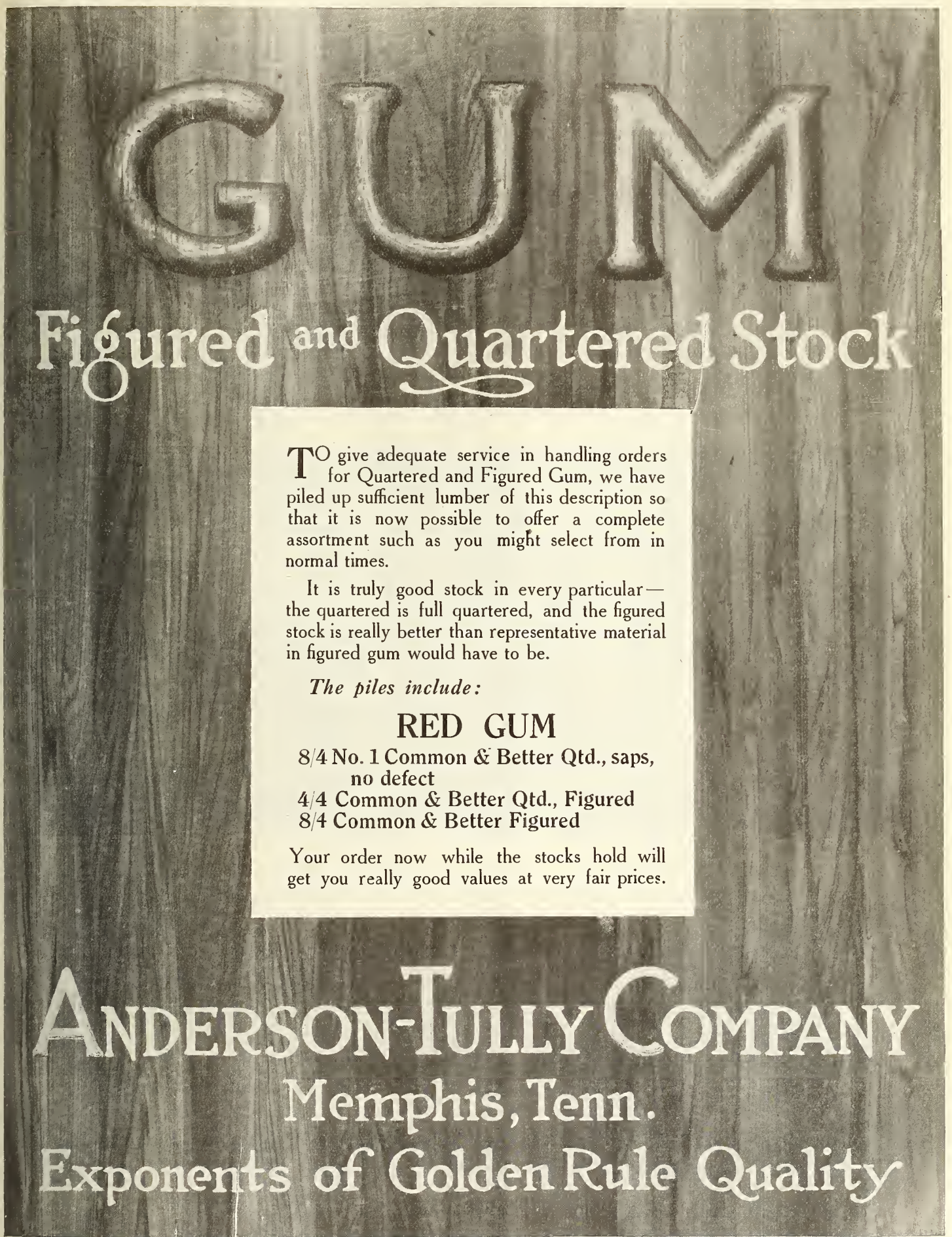
Machine for Pressing Shavings

Question: Can you tell us of any person who manufactures a press for pressing shavings in small blocks for domestic fuel? We have hundreds of tons of these shavings going to waste, and as they are considerable expense to draw down to the dump, and the price of fuel is so high it seems too bad to destroy them. We thought that if there is a press made for pressing these shavings it would be a good thing. If you know of one, kindly let us hear from you as son as possible.—A. Coates & Sons, Burlington, Ont.

The Garlock-Walker Machinery Company say: No information is given as to the size of the blocks, but we do not know of anything on the market for this work for as small a block as we imagine they desire to make, which would be approximately the size of an ordinary brick or a trifle larger.

A few years ago, in the States, there was considerable publicity given to this proposition of bricking shavings, but the writer is of the opinion that the matter was dropped. There are several shaving balers made, but whether the manufacturers of these would construct a small press would be a question to be put before them.

It frequently happens that a clutch which is entirely inadequate to bring a machine up to speed is unnecessarily large for the actual working load of the machine at full speed.


GUM
Figured and Quartered Stock
TO give adequate service in handling orders for Quartered and Figured Gum, we have piled up sufficient lumber of this description so that it is now possible to offer a complete assortment such as you might select from in normal times.
It is truly good stock in every particular—the quartered is full quartered, and the figured stock is really better than representative material in figured gum would have to be.
The piles include:
RED GUM
8/4 No. 1 Common & Better Qtd., saps, no defect
4/4 Common & Better Qtd., Figured
8/4 Common & Better Figured
Your order now while the stocks hold will get you really good values at very fair prices.
ANDERSON-TULLY COMPANY
Memphis, Tenn.
Exponents of Golden Rule Quality

Will Operate New Mill

The Probst Lumber Company, of Cincinnati, Ohio., manufacturers of hardwoods and white and yellow pine lumber, are putting in a new mill at Bucatunna, Miss., where they will manufacture dimension stock and specialize on squares cut to 8 ft. lengths. These latter will afterwards be trimmed to short lengths or whatever lengths customers may require.

The company state that they will have an up-to-date plant at Bucatunna, and that up to the present time they have been getting out a carload of squares per day. This quantity they expect to increase as conditions improve. Ninety per cent. of the cut of this mill will be gum, and the company believe they will be in a position to save their customers money on gum dimension stock.

The Toy Products of Canada, Limited

The Toy Products of Canada, Ltd., is one of the progressive firms in this country who are striving to prove that the Germans were enjoying a false monopoly of the toy market, and that it is possible for Canadians to compete with Germans and Austrians in this field.

The basic raw material which this company uses is wood, and for that reason they have located their plant in a district where wood is plentiful and where it is produced in large quantities. They are thus able to get their raw material at first cost, and manufacture under very favorable conditions. Shipping facilities are good, the plant being situated on the C.P.R., with a branch siding running into the factory yard.

The Toy Products of Canada, Ltd., have a large, commodious shop, located at Farm Point, on the Gatineau River, P.Q. The shop is equipped with modern automatic machinery, and is run and lighted by electric power. At present the company is purchasing the lumber they use, but they advise us that it is their intention to secure their own timber limits at an early date and establish their own sawmill, thus rendering themselves independent of outside producers. At the present time the company is making fifteen distinct lines of toys, and they are adding new lines as justified by the demand.

The builder toy, which was their leader last year, is a wood construction toy, capable of many variations. It is moderate in price and is instructive and entertaining. These features make it popular with both parents and children.

The lines manufactured include four lines of sailboats, wall quoit game, tiny tops game, siege of Berlin game, puzzle flag blocks, two sizes builder toy sets, cannon target, doll's fairy kitchen set, doll's tea set, two sizes rope toss, four sizes baseball bats, con-struct-o wooden alphabet sets, five varieties con-struct-o toys which can be built by the children, and a new line of carts and wagons. These play carts include doll's sulky, two-wheel play cart, wheelbarrow, four-wheel hay wagon, two sizes four-wheel express wagon, hay wagon with single horse, one with two horses, and delivery wagon with one horse attached.

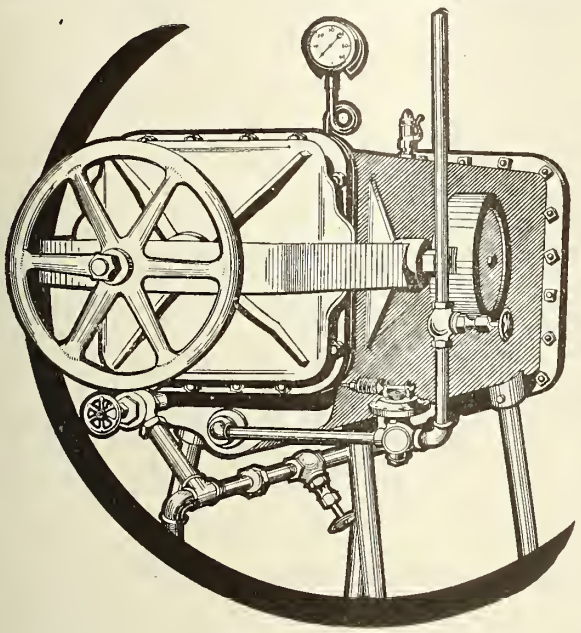
In addition to toys, the company, with their automatic machinery, is turning out all sorts of smooth wood turnings, such as handles, rosettes, etc. Their adjustable automatic dowel machine is capable of turning out smooth and perfectly round dowels, ranging in diameter from ¼ in. to 1 in. They can also turn out beaded and glue joint dowels. For these latter the company state that there is a large demand.

Wood turnings made by The Toy Products of Canada, Limited, Farm Point, P. Q.

The president of the company, Mr. Freeman T. Cross, is a prominent and large property owner in the vicinity, operating three lumber mills and broad timber limits. He develops the electric power which lights the town and runs the mill. The firm report a large increase of business over last year, and are very optimistic as to the future.

The most vital point to be considered in the installation and maintenance of line shafting for maximum economy is proper alignment. A shaft badly out of line is a dead loss continuously, and all the lubrication devices, ball bearings or roller bearings on the market will not prevent loss of power under such conditions. It is not difficult to keep a shaft properly lined up, and the time required for doing so is amply justified by the power saved.

Wood Steaming Retort



Wood Bending Manufacturers:

This is one of our

Perfection Retorts

which we guarantee will save you

50% Less Breakage

in your bending department than your present process; that your stock will dry in your forms or presses in one-third less time; that you will have no stained stock; that your stock will retain its shape much better after being bent; that it will dry in your dry-kiln in one-half less time and that your steam consumption will be reduced at least 90 per cent.

The door can be opened and closed in ten seconds, and it is steam and water tight and for this reason can be placed anywhere in your factory.

Compare this IMPROVED RETORT with your present steam boxes, then write us for our Booklet on Progressive Wood Steaming.

Made in Preston, Ontario

Perfection Wood Steaming Retort Co.

PARKERSBURG - WEST VIRGINIA

We offer

the following

Hardwoods

3 cars 4/4 in. No. 3 Common Birch.
4 " 4/4 in. No. 3 Com. and Bet. Birch.
4 " 4/4 in. Hard Maple Crating.
3 " 4/4 in. Maple and Beech Crating.
4 " 4/4 in. No. 3 Com. & Bet. Black Ash.
2 " 5/4 in. No. 2 Com. and Bet. Winter Cut Maple.
4 " 6/4 in. No. 2 Com. and Bet. Winter Cut Maple.
3 " 8/4 in. No. 2 Com. and Bet. Winter Cut Maple.
(Not over 10 per cent. No. 2 Com. in above three lots)
1 " 12/4 in. No. 1 Com. and Bet. Winter Cut Maple.
1 " 6/4 in. No. 1 Com. and Bet. Maple and Birch.
2 " 6/4 in. No. 1 Com. & Bet. Basswood.

Also 5/8 in. and 1 in. Spruce Crating

Ready for Prompt Shipment

We Shall Be Glad to Serve You

Graves, Bigwood & Co.

Manufacturers

of

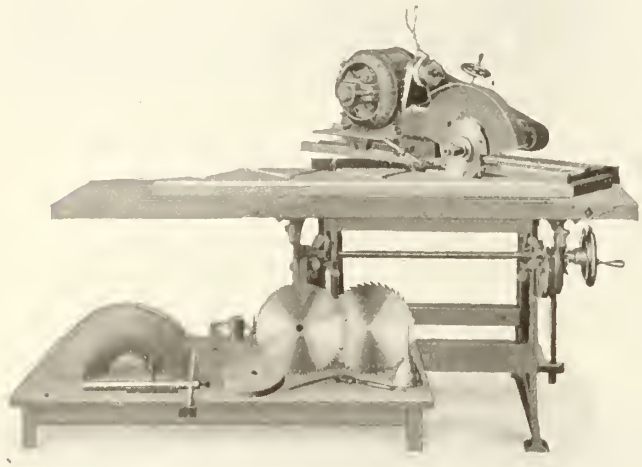
PINE
HEMLOCK
HARDWOOD } **LUMBER**

712 Traders Bank Building
TORONTO - ONT.

Mills at—Byng Inlet, Ont.
and
Deer Lake, Ont.

Improvements on Elliot Woodworker

The makers of the Elliot Woodworker believe in keeping abreast of the requirements of the trade, and have added several new improvements to their machine. These improvements comprise an iron top in place of the wood top which was formerly used, and a double bevel geared raising device. Besides these the jointer part of the machine is lowered so that the



The Elliot Woodworker, with iron table and new raising device.

slide and carriage clears the jointer fence when swung around for cross-cutting, etc.

The Elliot Woodworker has proved a favorite with contractors and others requiring a portable machine, as it can be moved from place to place on the job, as required by the workmen. The makers say it will rip stock 5 inches thick and joint at the same time. A number of these machines have recently been purchased by the United States Government, who are using three at their Norfolk Navy Yards, one at the Brooklyn Navy Yard, one at Newport News Navy Yard, and one at West Point Military Academy. The machines are being used for cutting and trimming material used in the building of wooden ships.

They can be taken right on to the deck of the ships or into the cabins. The current is supplied by running a wire to the machine wherever it is located. The fact that the machines have ben chosen by the United States Government speaks well for their efficiency and incidentally for a Canadian invention.

Contractors find the machine useful for cutting joists, foot and plumb cuts on rafters, framing, trim, concrete form work, etc. It has also proved its merits in numerous pattern-makers' and wagon-makers' shops and in some of the large woodworking factories.

The agency for the Elliot Woodworker in the Maritime Provinces has recently been given to the A. R. Williams Company, of St. John, N.B., while Oliver & Co., 296 St. James Street, Montreal, will look after the Quebec business. The head office and factory of the Elliot Woodworker, Ltd., is at College and Bathurst Streets, Toronto.

Determining Horse Power of Belt

A great deal of technical data is available for the proportioning of belting for a given service; in fact, there is so much and it varies so widely that it is difficult to tell what can be relied upon. However, for average line shaft service, transmitting power to woodworking machinery and operating at 300 to 350 r.p.m., a single leather belt 1 in. wide running at a linear speed of approximately 900 feet per minute will transmit one horse power, or for double belt 630 feet per minute will transmit one horse power.

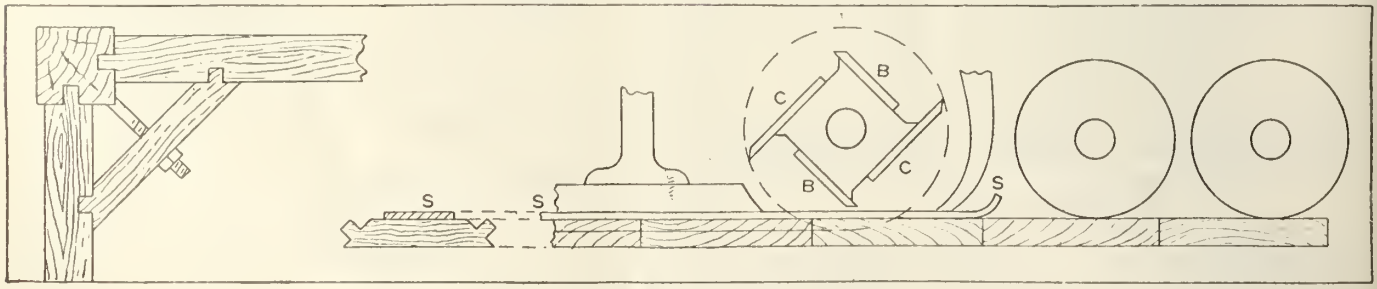
From this data the horse power of any width of double or single leather belt at any speed, up to about 4,500 ft., may be quickly determined by multiplying the actual velocity of a belt and its width in inches and dividing the product by either of the two figures given above.

Making Corner Braces on the Molder

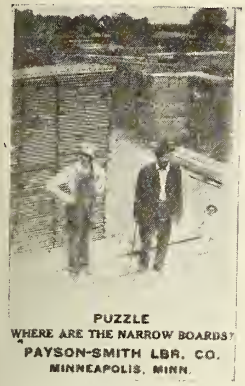
Furniture manufacturers employ various methods in getting out the corner braces commonly used to strengthen table leg framing. A writer in 'The Woodworker" states that in Fort Worth, Tex., at the Hub Furniture Company plant, the braces are run on a molder as shown in accompanying sketch. Surfaced cuttings from the stock saw are squared up, cut to the required length, and trucked to the molder.

In order to hold the short (crosswise) pieces solid as they pass under the top head, there is a steel shoe, S, fastened to the under side of pressure-bar and extending clear under top head and chip-breaker, as shown. The top head is set to clear this shoe, but to be on the safe side, i.e., to protect the lips of the head in case shoe S accidentally raises a little too high, there are bolted on two sides of the head a pair of old dull surfacers, B B. These will strike the shoe in case it happens to raise; the lips are thus protected and no harm is done.

Long spike knives, C C, cut the top V's and bevels, while the remaining side V's are finished on the side heads. The opening between the guides at each side head must be as small as possible, or a better plan is to use hardwood guides and let the side head knives cut through them, as is done in shaper work. This prevents the side heads from jerking the blocks around out of square as they feed through. The extreme mitered points of these corners are better if left slightly square, say one-sixteenth inch or so.



Showing how corner braces are made on molder.



Dry Hardwoods

4 cars 3/4 No. 1 Com. and Bet. Plain Red Oak.
5 cars 3/4 No. 1 and 2 Common Plain Red Oak.
10 cars 4/4 No. 1 Common Plain Red Oak.
5 cars 4/4 No. 2 Common Plain Red Oak.
5 cars 4/4 F.A.S. Plain White Oak.
5 cars 4/4 No. 1 Common Plain White Oak.
5 cars 4/4 No. 2 Common Plain White Oak.
5 cars 6/4 No. 1 Com. and Bt. Plain White Oak.
5 cars 8/4 No. 1 Com. and Bt. Plain White Oak.
3 cars 8/4 No. 2 Common Plain White Oak.
2 cars 4/4 F.A.S. Quartered White Oak.
2 cars 4/4 No. 1 Common White Oak.
6 cars 6/4 F.A.S. White Oak.

We also have a fine stock of Northern Hard Maple, Birch, Basswood, etc.

Payson Smith Lumber Co.

Chicago Office: 1665 Old Colony Bldg. J. C. Moffat, Rep.
Minneapolis, Minn.
Detroit Office: Henry Clay Hotel P. M. Youngblood, Rep.

DIMENSION STOCK

Will save you money, increase your capacity and make higher grade Furniture, because it is clear

2 cars 3x3 8 ft. clear Sap Gum.
2 cars 2x2 8ft. clear Sap Gum.
1 car 2x2 48 in. clear Oak Squares.
5 cars 2x2 30 in. clear Sap Squares.
1 car 2½x2½ 30 in. clear Sap Squares.
1 car 2x2 30 in. clear Red Gum.
3 cars 2x2 30 in. clear Oak Squares.
1 car 2x2 30 in. clear Ash Squares.
2½x2½ 30 in. clear Ash Squares.

Write us when in the market for all kinds of HARDWOODS, cut to your sizes.

The Probst Lumber Co.

Cincinnati, Ohio

Saw and Knife Fitting Machinery and Tools

Saw Anvils
Brazing Clamps
Brazing Compound
Filers
Filing Clamps
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Lap Cutters
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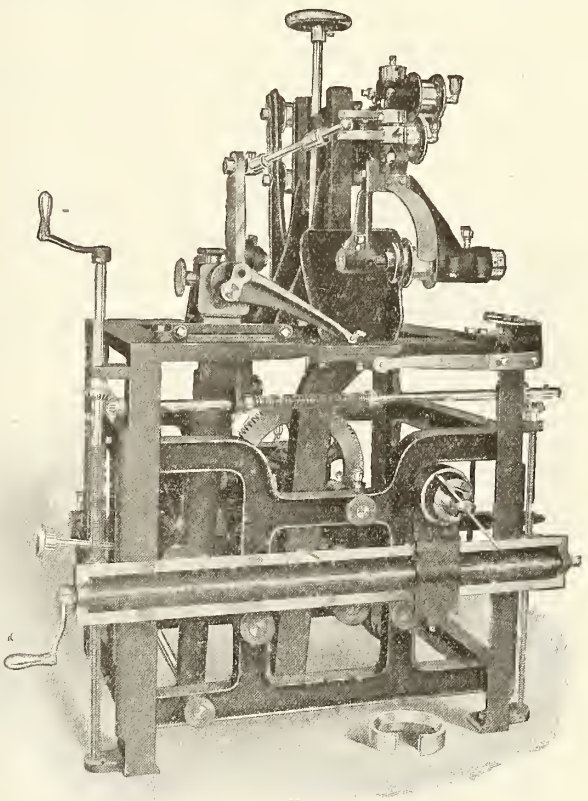
Straight Edges
Stretchers
Swages
Tension Gauges
Tools
Bandwheel Cutter and Tool Grinders
Knife Grinders and Balances

Describe Your Requirements.
Catalog with special information furnished on request.

Machinery Company of America

Grand Rapids, Mich., U.S.A.

"Covel" — "Hanchet" — "B T & B" Machinery



Automatic Rip and Crosscut Circular Saw Sharpeners.
Sizes for Saws 6" to 96" Diameter.

News of the Trade

The Canadian Aeroplanes, Ltd., Dufferin and Lappin Avenue, Toronto, are going to erect a dry kiln at their plant.

The Maxwell Motor Company, of Detroit, Mich., are planning to erect a factory, to cost $140,000, at Windsor, Ont.

The Allied Chemicals, Ltd., has been incorporated at Toronto, with capital of $40,000, to manufacture chemicals, dyes, etc.

The London Art Woodwork Company, of London, Ont., are contemplating extending their factory and adding a boiler-house. Joseph Keller is the manager.

The plant of the St. Lawrence Lumber and Box Company at South Lancaster, Ont., has been damaged by fire. About $3,000 worth of lumber was destroyed.

Mr. William Bailey, who for many years was identified with the firm of Bailey Brothers, who operated a sash and door factory at Orillia, Ont., died at Winnipeg, Man.

The London and Petrolia Barrel Company, London, Ont., are installing a Canada special lumber-curing dry kiln at their plant. The kiln will have a capacity of 30,000 feet per day.

The Pacific Construction Company will build a large planing mill at Port Coquitlam, B.C. The mill and yards will be equipped with the most up-to-date machinery, electric cranes, booms, etc.

A new toy company, to be known as the Standard Doll, Toy and Novelty Manufacturing Company, has been incorporated at Montreal, with capital of $20,000, to manufacture toys, novelties, etc.

The Rayola phonograph is being manufactured in London by the London Phonograph Company. Mr. Ray, a well known manufacturing jeweller of London, controls the company, whose headquarters are at 234 Dundas St.

The London Art Woodwork Company, London, Ont., are manufacturing the Lawcola phonograph. J. J. Callaghan, well known in London, Ont., business circles, and formerly in the piano business, is interested in this company.

Frank Burton, an employe of the London Box Company, London, Ont., met with a painful accident at the company's plant recently. He slipped and fell against a rapidly-revolving circular saw, severing his arm between the wrist and elbow.

A warehouse at the plant of William Rutherford & Sons, Montreal, containing finished lumber, doors, window frames, hardwood flooring, and ammunition boxes, etc., was recently destroyed by fire. The damage was estimated at $30,000, and is fully covered by insurance.

Messrs. Brown and Haley are withdrawing from the woodworking firm of Messrs. Turner, Brown & Haley, Moncton, N.B., and hereafter the name will be W. H. Turner & Co. A large variety of woodwork, including doors, sash, mouldings, bank fittings, etc., are made in this plant.

J. N. Arpin, of Holmes & Arpin, box manufacturers, Montreal, was recently found lying in his office with two bullet holes in his head, apparently self-inflicted. Mr. Arpin was removed to the hospital, but died a few minutes after his arrival. He was 42 years of age, an was well known in the woodworking business in Montreal.

The Canadian Cooperage Manufacturing Company had another fire scare at their plant recently, a blaze having started in the roof of the engine-house. The damage was negligible. It is thought the heat of the sun on the iron roof and the heat from the engine below started the fire, and extra precautions are being taken to prevent a repetition of the occurrence.

The Sanitary Bedding Company, Ltd., which recently opened a factory at 192-194 Queen Street East, Toronto, are now manufacturing their new lines of folding beds, including their Peerless divanette and the Twentieth Century, the latter being a low-price divanette. R. Coppersmith, who has had extensive experience in the manufacture of davenports, etc., in the United States, is the manager.

A new company has been started in Montreal East, known as the Arts Furniture and Mouldings Company, Ltd. They will manufacture fancy tables, showcases, wall cases, store fixtures, trimmings, and mouldings. The president of the company is Mr. O. B. Meunier, and Mr. J. T. Morin is the secretary-treasurer. The company are busy getting things in shape to manufacture a line of fancy tables for the drawing-room. They expect to have everything in working order in the course of a couple of weeks.

The warehouse, planing mill, and box factory owned by the Cameron Lumber Company, Ltd., Victoria, B.C., was totally destroyed by fire, which was caused from an overheated bearing. The loss is approximately $80,000, of which $25,000 will be recovered in insurance. Among the stock destroyed was some twenty carloads of box shooks, which were stored waiting for shipment. The Cameron Lumber Company advise that they will rebuild their plant immediately. They have already started to clear the space, and have received the drawings for the new building. Some of the machinery is already on the way.

To Use or Not To Use Electric Drive

There exist very logical reasons why many of the woodworking plants should employ electric distribution in their mills, shops and factories, since the electric current fills a triple function in that light, heat and power are at once available from the same source—light, brilliant, of agreeable quality and easily portable; power, flexible and peculiarly adaptable for individual driving; heat for glue pots, etc., concentrated and easily controlled.

The inherently high speed of woodworking tools, the inflammable nature of the manufactured product, and its waste material, the generally intermittent character of the load, etc., provide additional reasons why both the manufacturers of woodworking apparatus and the central station should carefully study the possibilities of electric drive, know its breadth of adaptation, and acquire a fund of practical working data from recommendations by managers, superintendents and foremen.—Hardwood Record.

Motor Vehicles Manufactured in 1916

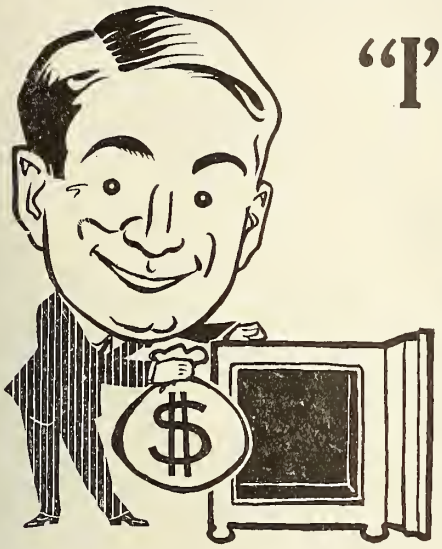
The DuPont Fabrikoid Company recently compiled some statistics concerning the automobile industry, which have a bearing on the use of their product. To quote from their statistics:

"There were 1,617,708 motor vehicles manufactured or put on the market in 1916.

"Seventy-five per cent. of the number of cars sold are known as standard cars, and sell for $1,000, or less.

"Of this number 60 per cent. are being upholstered in fabrikoid," a very significant compilation of figures which indicates the acceptability of fabrikoid as a leather substitute.

"There is an undoubted advantage in using fabrikoid for upholstering purposes when the price limit or the supply situation is a controlling factor, because of the uniformity of grade and the definite width. There are no weak spots, blemishes, nor rough edges, and wastage is reduced to a minimum. This material reproduces the luxury of upholstery leather, and is grease and stain proof, as well as washable.



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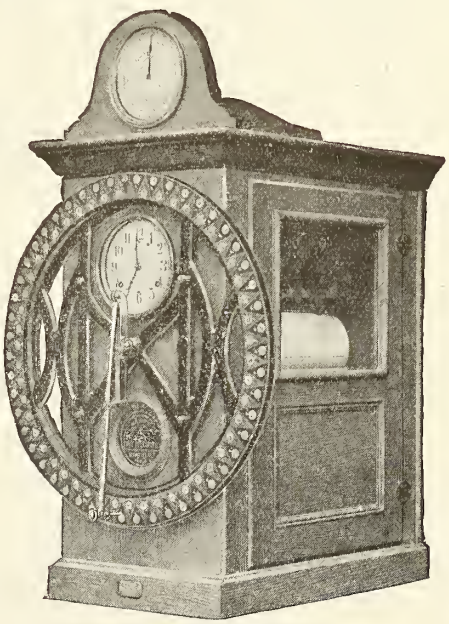
VANCOUVER OFFICE—R. Donohoe, 305 Berk's Building



International Weekly Dial Recorder

This time recorder gives in complete form the payroll for an entire week. You can easily file each sheet away in a binder for future reference.

Varnish Gums

Since we have to import much of our varnish gums, there has naturally been some scarcity and higher prices during the war period, but there is evidence of some improvement in the quantity from some sources now, as compared to last year, which will help some, even though the price may be a bit higher, writes Veneers. In this connection our commerce reports state that kauri gum amounting to 8,516,935 pounds, valued at $1,353,475, was invoiced at the American consulate-general at Auckland, New Zealand, for the United States, during 1916, against 7,193,480 pounds, valued at $1,087,601, for 1915.

Meat Boxes Required in Argentina

A report from the Acting Canadian Trade Commissioner at Buenos Ayres, published in a recent issue of the Weekly Bulletin of the Canadian Department of Trade and Commerce, says:

Large numbers of boxes are used by the Argentine packing houses for the purpose of shipping the various classes of meat products, such as sweetbreads, livers, etc. The boxes are purchased knocked down and afterwards put through a nailing machine at the works. In normal times most of the shooks are imported from Sweden and the United States, but lately, owing to the larger requirements consequent upon the increased European demand and the difficulties experienced in obtaining regular supplies from abroad, orders for considerable quantities have been placed locally.

Enquiries made at two of the larger establishments regarding the style, measurements, and approximate prices of boxes in use elicited the following information, which may be of interest to Canadian box-shook manufacturers:

The dimensions given for the five principal types used by one of the largest packing houses are as follows:

	Width. Inches.	Length. Inches.	Depth. Inches.	Ends. Inches.	Sides. Inches.	Tops and bottoms. Inches.
No. 1	9⅜	12 15/16	11 3/16	¾	½	½
No. 2	16	15 13/16	9	¾	⅝	½
No. 3	12⅜	18½	12½	¾	⅝	½
No. 6	17	24	8	¾	⅝	⅝
No. 7	17	26	12	1	⅝	⅝

The measurements given above are interior. The prices c.i.f. Buenos Ayres which are being paid to-day for meat boxes of the above dimensions are as follows:

No. 1 Parana pine, 25c each; No. 2 spruce pine, 42c each; No. 2 Parana pine, 34c each; No. 3 spruce pine, 51c each; No. 3 Parana pine, 40c each; No. 6 spruce pine, 68c each; No. 6 Parana pine, 57c each; No. 7 spruce pine, $1.02 each; No. 7 Parana pine, 72c each.

Parana pine is a Brazilian wood, somewhat similar to that generally known as Brazilian pine, but is more yellow in color than the Brazilian pine, which has a streak of red. Parana pine is not, of course, so well adapted for the purpose of meat shipping as is spruce, but, as can be seen, it has a considerable advantage in point of price.

The report also contains details of the requirements of one or two other firms. These vary slightly from the sizes given above. For the names of the meat-packing companies prepared to consider quotations for the above-mentioned meat boxes box manufacturers should communicate with the Commercial Intelligence Branch of the Department of Trade and Commerce, referring to enquiries No. 981, No. 982, and No. 983.

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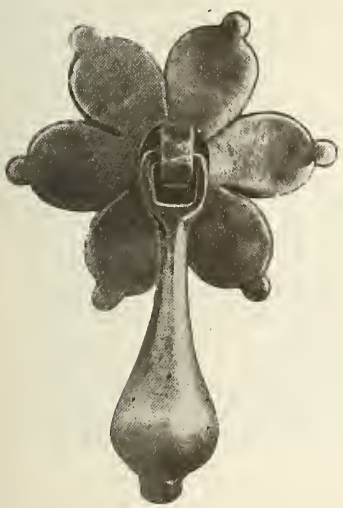

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1 Fay & Egan Box Board Cut Off Saw.
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215 Butler Street,
CINCINNATI, OHIO

Paint Protection of Steel and Iron

Painting of exposed iron work is a method that aims to prevent rust deterioration by excluding the moisture that is essential for the production of rust.

Paints for this purpose usually consist of an oil vehicle and a pigment. The lead pigments, notably the red lead and the blue lead, are particularly high-grade materials, since the process of manufacture ensures a minimum of dangerous ingredients. Their usual fineness permits intimate mixing with oils so as to form an integral and homogeneous part of the paint film.

Other pigments act in a more or less heterogeneous manner, and do not thoroughly mingle with the oil vehicle. Zinc oxide, although frequently used as a pigment, is sometimes unsatisfactory, in fact, owing to its liability to form zinc carbonate, which has twice the volume of zinc oxide, it causes blistering and peeling of the paint film.

Adulterations as pigments, such as chalk, gypsum, talc, etc., are mostly valueless. Some are soluble, while others contain or absorb water, and others again hold attacking acids in combination.

Linseed oil, in either the boiled or raw form, is the principal vehicle used in paint manufacture. The former contains less water than the latter, and is superior on this account.

The best possible combination is a lead priming coat, covered with a high-grade graphite, pigments being mixed in a good quality, well-prepared, boiled linseed oil. Cheaper pigments will serve under certain conditions or if temporary coatings only are desired for special purposes.

The process of application determines very largely the value of the paint coat. Careless application can render a good coat valueless. Unless the steel work is thoroughly cleaned of all rust before coating with paint, rapid destruction cannot be prevented by the highest-grade materials. The removal of the rust may entail the use of the sand-blast, but a coat of whiting is as useful as a lead paint if the rust is left on.

Driers of the volatile type, by making the film porous, prove detrimental, the escape of bubbles of gas making holes which do not close, thereby rendering the underlying metal accessible to attack.

If paint is applied too thickly the top dries, leaving the core plastic. This condition makes a film susceptible to peeling or rupture. Two thin coats are better than one thick one, since the second one will largely correct the deficiences of the first. Experiment indicates that four coats at least are necessary to give an impervious finish.

No paint is a permanent protection against rust, but reasonable results can be expected if high-grade materials are used and care is shown in the selection of the ingredients and in the application of the paint.—Painters' and Decorators' Magazine.

A total computed lumber cut for the United States in 1916 of 39,807,251 board feet is announced by the Forest Service. This figure is based on reports received up to April 15, from 17,201 sawmills out of the 30,081 believed to have operated last year. It is estimated that the actual cut was slightly in excess of 40,000,000 feet. An earlier estimate, based on partial reports, indicated a total output of 41,750,000,000 feet. The figures now given are regarded as practically final.

The state of Washington was again the largest producer with a lumber cut of 4,492,997,000 feet; Louisiana was second with 4,200,000,000 feet, and Mississippi third with 2,730,000,000 feet.

Southern yellow pine with a total of 14,975,000,000 feet forms 37.6 per cent. of the entire cut. Douglas fir, its nearest competitor, is credited with 5,416,000,000, while oak, with a cut of 3,500,000,000 is third.

Production in 1916 was, it is stated, hampered by a general lack of shipping facilities and local unfavorable weather conditions which tended toward curtailment. Among the smaller mills that scarcity of labor and the consequent higher wages paid resulted in a smaller output than would ordinarily be the case in a year of good demand.

The number of mills operating and reporting in 1916 was greater than for the preceding year. These figures, however, as well as the trade conditions, were more nearly normal than in any year since 1913.

In the boiler room of a hardwood flooring mill in a town in Michigan attention was called to what seems to be quite a fuel saver, as well as doing away with boiler compound. At this plant shavings are blown into the furnace, which naturally makes it hard on the flash plates which burned out quite frequently. About a year ago the engineer took up the idea of using seven-inch steam pipes to take the place of flash plates. These pipes are connected with the regular feed water pipes, so it is plainly seen that the water must be intensely hot when it enters the boiler. The engineer claims that this method has worked wonders toward preventing the boiler scaling. Before the change was made they were obliged to use a considerable amount of compound, which, in turn, necessitated the use of considerable more cylinder oil than they are now using, while the saving in fuel is great. This system has stood several expert inspections by boiler inspectors and been pronounced perfectly safe.—Hardwood Record.

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36" Crescent, pedestal.
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No. 3 Crescent, universal.
No. 5 Crescent, sliding top.
Ballantine variable power feed.
12' Defiance automatic equalizer.
MacGregor Gourlay railway cut-off.
6' Crescent iron frame swing.
Ideal, variety.
30" Canadian pole saw.

Mortisers
Cowan hollow chisel, M190.
Galt upright, compound table.
No. 5 New Britain, chain.
No. 2 Smart foot power.
No. 1 Smart foot power.

Moulders
13" Clark-Demill four-side.
12" Cowan four side.
10" Houston four side.
6" Cowan four side.
6" Dundas sash sticker.

Sanders
24" Fay double drum.
12" C.M.C. disk and drum.
18" Crescent disk, disk and drum (2)

Clothespin Machinery
Humphrey No. 8 giant slab resaw.
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Humphrey automatic lathes (6).
Humphrey double slotters (4).

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Fay & Egan 12 spindle dovetailer.
MacGregor Gourlay 12 spindle dovetailer.
Cowan dowel machine, M80.
No. 1 Ballantine dowel machine.
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Crescent post boring machine.
Cowan sash clamp.
Egan sash and door tenoner.
No. 4A Fox wood trimmer.
26" Dominion lath trimmer.
Single spindle wood shaper.
Defiance shovel handle shapers
48" 3 saw edger.
20" American wood scraper.
16" Ideal wood lathes (3).
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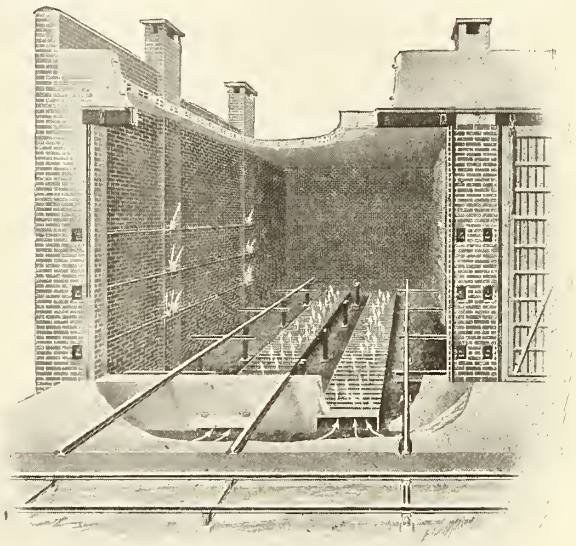

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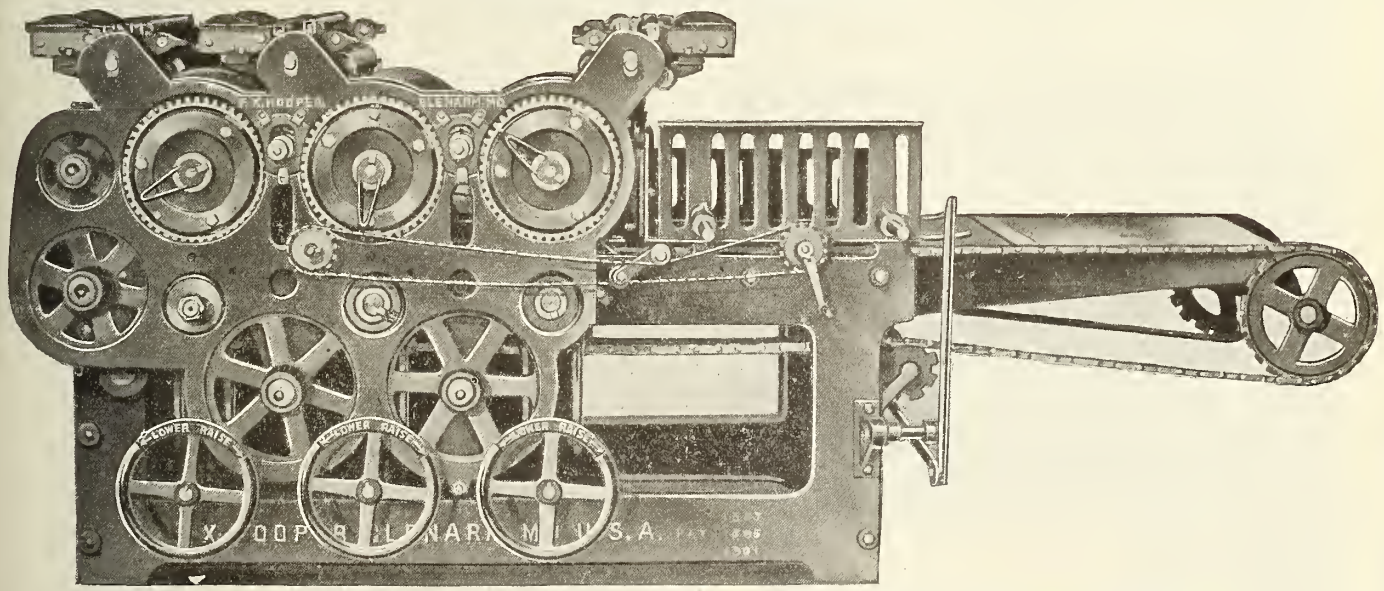

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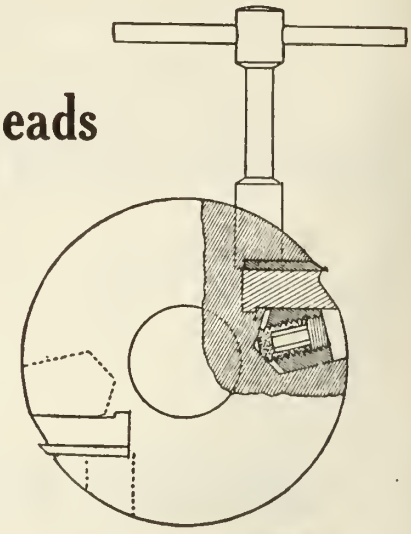

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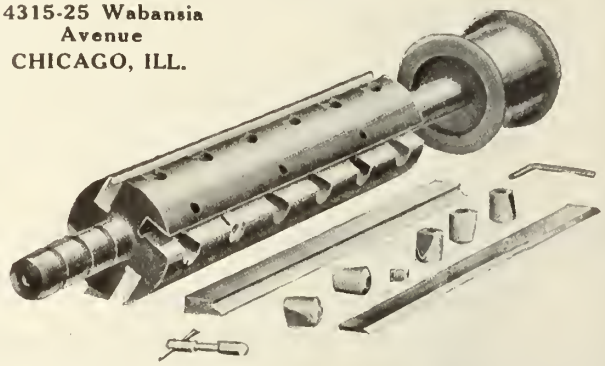

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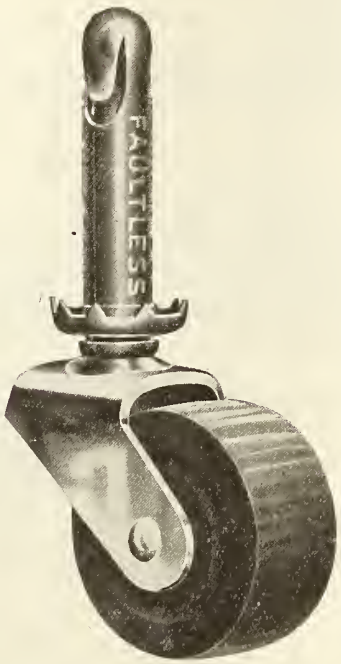

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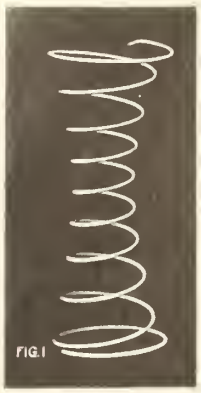

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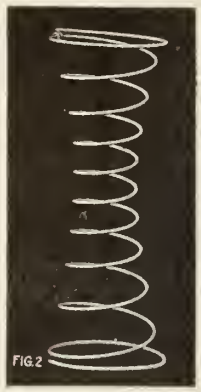

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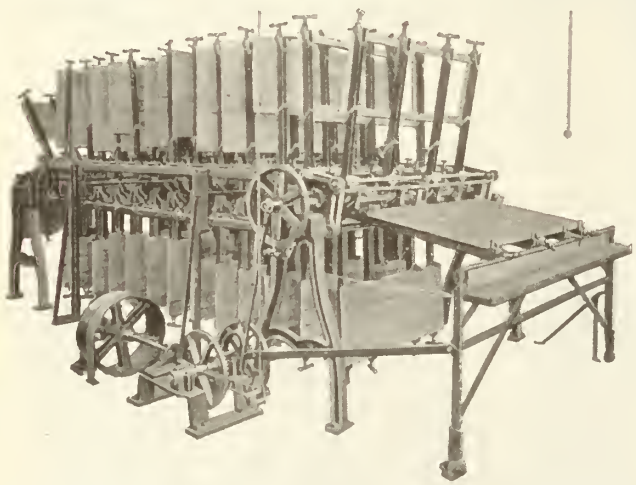
Glue Clamp Carrier



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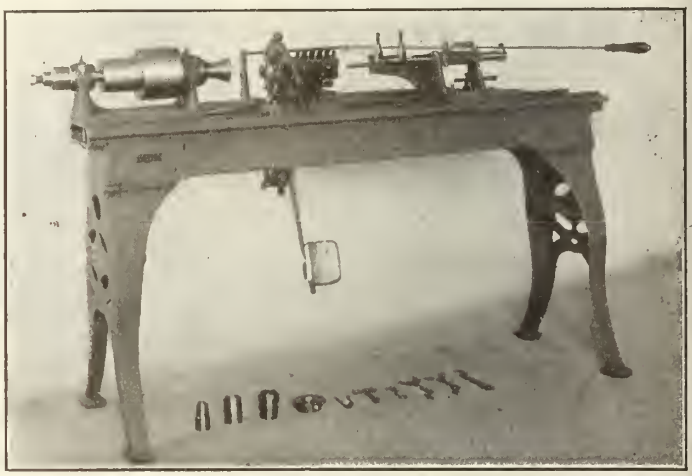

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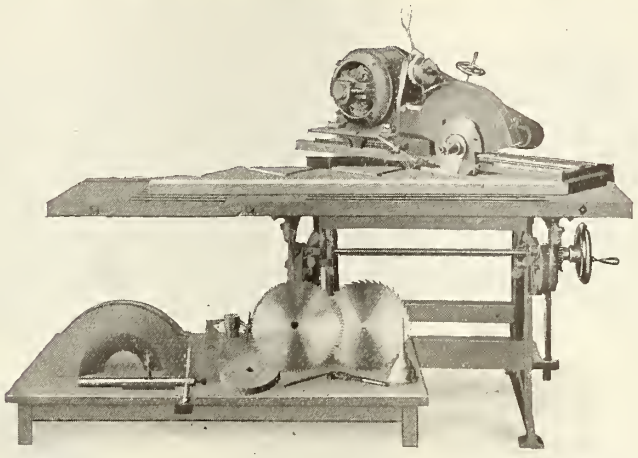

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Our No. 5 Machine has an iron top, double bevel geared, raising device, and the jointer is lowered so the slide and carriage clears the jointer fence when swung around for cross-cutting, etc. It will rip 5″ thick and joint at the same time. It cuts joist, foot, plumb and side cuts of jackrafters, studding, door and window-frames, concrete form work, trim, etc. Pattern makers, wagon makers and cabinet makers are finding this machine a great money-saver.

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You Have Paid for an Installation of

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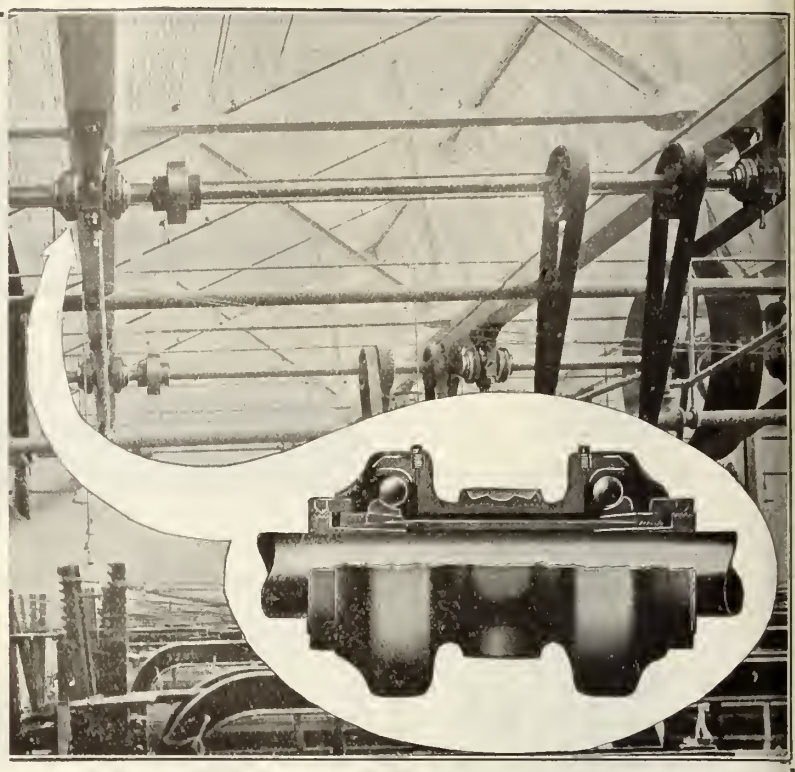
HAVE YOU GOT THEM ?

Ordinary line shafting wastes from 15 per cent. to 60 per cent. of power.

Line shafting equipped with Chapman Double Ball Bearings will eliminate about 75 per cent. of the friction, thus averaging a total saving of from 15 per cent. to 30 per cent.

Chapman Double Ball Bearings fit any adjustable hanger and require oiling and attention only once a year. No extra equipment required to install.

Write to-day for full particulars.



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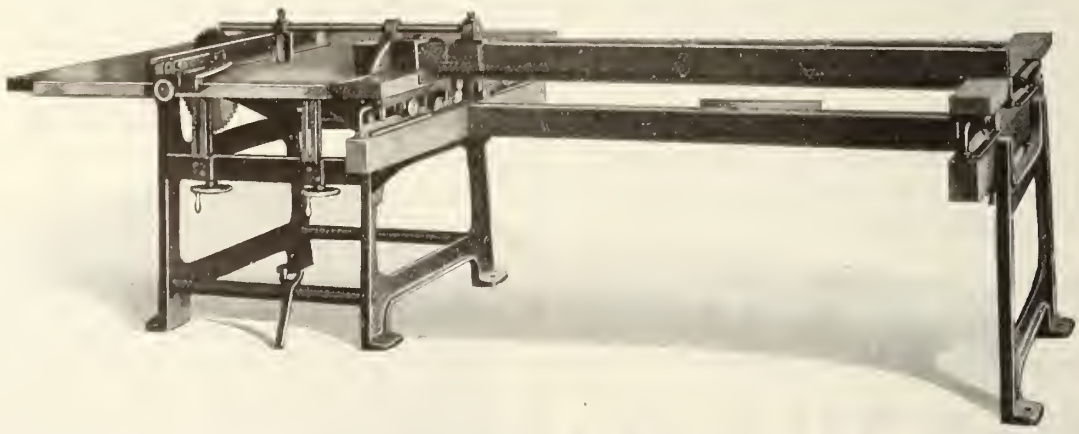
Toronto 339-351 Sorauren Ave. Ontario

American Branch: The Transmission Ball Bearing Co., Inc., 32 Wells St., Buffalo, N. Y.

BOX MACHINERY

Keep down rising costs by installing Automatic Labor Saving Box Machines.
We manufacture the most complete line of Box Machines on the market.



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For Box Factory—Sash and Door Factory—Furniture Factory. Two separate saw arbors.
Adapted for Ripping—Cross-Cutting—Dadoing Grooving, etc.

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Try it

Our High Grade Babbitt

Owing to its phenomenal ability to absorb oil "Trojan" babbitt will be found ideal for overhead bearings in line and counter-shafts as it is unnecessary to oil as often as with the ordinary babbitts.

Try it

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"I need only clean the boiler once in four weeks!"

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that he has written an account of his experiences which will profit his brother engineers everywhere.
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"I have worked other Traps but I never saw one as simple as the Morehead!"

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VAPOR DRY KILN
GRAND RAPIDS
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Increasing output of other kilns is part of our business.

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Saw Fitting Manual, a treatise on the care of saws and knives. Deals with everything in the saw and knife alphabet, from adjustments to widths. 144 pages. Price $2.00.

Common-sense Handrailing, by Fred T. Hodgson. Published by Frederick J. Drake & Company, Chicago. 114 pages, illustrated. Price 50c.

Roof Framing Made Easy, by Owen B. Maginnis. Published by The Industrial Publication Company, New York. 164 pages, illustrated. Price 50c.

"Carpentry," by Ira S. Griffith. Published in 1916 by The Manual Arts Press. 188 pages, illustrated. Price $1 00.

Handrailing Simplified, by An Experienced Architect. Published by William T. Comstock, New York. 52 pages, illustrated. Price 50c.

How to Join Mouldings; or, The Arts of Mitering and Coping, by Owen B. Maginnis. Published by William T. Comstock, New York. 72 pages, illustrated. Price 50c.

Utilization of Wood-Waste (Second Revised Edition), by Ernst Hubbard. Published in 1915 by Scott, Greenwood & Sons. 192 pages, illustrated. Price $1.50.

Woodworker Publishing Company, Limited
345 Adelaide Street West, Toronto, Ontario

The "Canadian Woodworker" Buyers' Directory

An Index to the Best Equipment and Supplies

ABRASIVES
The Carborundum Co., Niagara Falls, N.Y.

AIR BRUSH EQUIPMENT
DeVilbiss Mfg. Co., Toledo, Ohio.

ANNUNCIATORS
Signal Systems, Limited, Toronto, Ont.

BABBITT METAL
Canada Metal Company, Toronto, Ont.
Hoyt Metal Co., Toronto.

BALL BEARINGS
Chapman Double Ball Bearing Co., Toronto.

BALUSTER LATHES
Garlock-Walker Machinery Co., Toronto, Ont.
Mattison Machine Works, C., Beloit, Wis.
Whitney & Son, Baxter D., Winchendon, Mass.

BAND SAW FILING MACHINERY
Canada Machinery Corporation, Galt, Ont.
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Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

BAND SAWS
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Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

BAND SAW MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio
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Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

BAND SAW STRETCHERS
Fay & Egan Co., J. A., Cincinnati, Ohio
Machinery Co. of America, Grand Rapids, Mich.
Yates Machine Co., P. B., Hamilton, Ont.

BENDING MACHINES
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Perfection Wood Steaming Retort Company, Parkersburg, W. Va.

BELLS, ELECTRIC
Signal Systems, Limited, Toronto, Ont.

BELTING
Fay & Egan Co., J. A., Cincinnati, Ohio.

BENCH PLANERS
Wallace & Co., J. D., Chicago, Ill.

BLOWERS
Canadian Blower & Forge Co., Kitchener, Ont.
Sheldons, Limited, Galt, Ont.
Toronto Blower Co., Toronto, Ont.

BLOW PIPING
Sheldons, Limited, Galt, Ont.

BORING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
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Mereen-Johnson Mach. Co., Minneapolis, Minn.
Nash, J. M., Milwaukee, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Reynolds Pattern & Machine Co., Moline, Ill.
Yates Machine Co., P. B., Hamilton, Ont.

BOX BANDS
American Steel Band Co., N. S., Pittsburgh, Pa.
Laidlaw Bale-Tie Co., Hamilton, Ont.

BOX MAKERS' MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mereen-Johnson Machine Company, Minneapolis, Minn.
Neilson & Company, J. L., Winnipeg, Man.
Preston Woodworking Machinery Company, Preston, Ont.
Reynolds Pattern & Machine Co., Moline, Ill.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

CABINET PLANERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

CARS (Transfer)
Sheldons, Limited, Galt, Ont.

CARBORUNDUM PAPER
Carborundum Co., Niagara Falls, N.Y.

CARVING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

CASTERS
Burns & Bassick Co., Bridgeport, Conn.
Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.

CLAMPS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Neilson & Company, J. L., Winnipeg, Man.
Palmer & Sons, Albert E., Owosso, Mich.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Company, Montreal, P.Q.

COLUMN MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

CORRUGATED FASTENERS
Acme Steel Goods Company of Canada, Ltd

CRATING LUMBER
Read Bros., Limited, Toronto.

CUSTOMS TURNINGS
Galbraith & Co., Ltd., Owen Sound, Ont.

CUT-OFF SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, Que.
Yates Machine Co., P. B., Hamilton, Ont.

CUTTER HEADS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, Beloit, Wis.
Shimer Cutter Head Co., Galt, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

DOVETAILING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont
Jackson, Cochrane & Company, Kitchener, Ont

DOWEL MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

DOWELS
Toy Products Co. of Canada, Farm Point, Que.

DRY KILNS
Grand Rapids Veneer Works, Grand Rapids, Mich.
National Dry Kiln Co., Indianapolis, Ind.
Sheldons, Limited, Galt, Ont.

DUST COLLECTORS
Sheldons, Limited, Galt, Ont.

DUST SEPARATORS
Sheldons, Limited, Galt, Ont.

EDGERS (Single Saw)
Canada Machinery Corporation, Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio
Garlock-Walker Machinery Co., Toronto, Ont
Simonds Canada Saw Co., Montreal, Que.

EDGERS (Gang)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

END MATCHING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

EXHAUST FANS
Garlock-Walker Machinery Co., Toronto, Ont.
Sheldons Limited, Galt, Ont.

FEED ATTACHMENTS
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.

FILES
Simonds Canada Saw Co., Montreal, Que.

FLOORING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass
Yates Machine Co., P. B., Hamilton, Ont.

FLUTING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio

FLUTING AND TWIST MACHINE
Preston Woodworking Machinery Company, Preston, Ont.

FURNITURE CARVINGS
Decorators Supply Co., Chicago, Ill.

FURNITURE TRIMMINGS
Burns & Bassick Co., Bridgeport, Conn.
Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.

GARNET PAPER AND CLOTH
The Carborundum Co., Niagara Falls, N.Y.
Ritchey Supply Company, Toronto, Ont.

GRAINING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Yates Machine Co., P. B., Hamilton, Ont.

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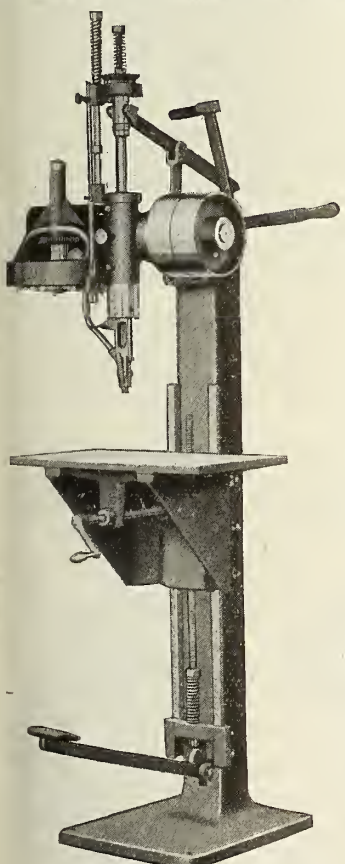

No. 2 Standard Type Automatic Screw-driving Machine.

The Only Way to Drive Screws

There is a stage-coach method and a modern method of doing everything. When it comes to driving screws the only modern way is with an Automatic Screw Driving Machine, which means greater and better production and greater profit.

The Reynolds Automatic Screw-Driving Machine

is guaranteed to produce results. It is no experiment. The No. 2 Standard Type, shown herewith, is particularly suited for placing the screws in shrapnel boxes. It may be fitted to drive, without change or adjustment, any three consecutive sizes flat or round head, or two sizes filister head, No. 6 to 14 inclusive, wood or machine screws, or three sizes flat or round head, or two sizes filister head machine screws up to No. 20. All the above up to 1½ inches long if smaller than No. 10, or up to 1¾ inches long, No. 10 or larger. Fitted with boring attachment if desired.

Many Machines in Use in Canada.

Ask for our Catalogue.

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"Canadian Woodworker" Buyers' Directory—Continued

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GLUE CLAMPS
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Neilson & Company, J. L., Winnipeg.

GLUE HEATERS
Fay & Egan Co., J. A., Cincinnati, Ohio.
International Electric Co., Indianapolis, Ind.
Jackson, Cochrane & Company, Kitchener, Ont.

GLUE JOINTERS
Canada Machinery Corporation, Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Yates Machine Co., P. B., Hamilton, Ont

GLUE SPREADERS
Fay & Egan Co., J. A., Cincinnati, Ohio
Jackson, Cochrane & Company, Kitchener, Ont.

GLUE ROOM EQUIPMENT
Billstrom, Nels. J., Rockford, Ill.
Perrin & Company, W. R., Toronto, Ont.

GRAVITY CARRIERS
Canadian Mathews Gravity Carrier Co.

GRINDERS (Cutter)
Fay & Egan Co., J. A., Cincinnati, Ohio
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.

GRINDERS, HAND AND FOOT POWER
The Carborundum Co., Niagara Falls, N.Y.

GRINDERS (Knife)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

GRINDERS (Tool)
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Kitchener, Ont

GRINDING WHEELS
The Carborundum Co., Niagara Falls, N.Y.

GROOVING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Mattison Machine Works, C., Beloit, Wis.

GUARDS
Gustafson & Scott Mfg. Co., Chicago, Ill.

GUM LUMBER
Anderson-Tully Co., Memphis, Tenn.
Brown & Co., George C., Memphis, Tenn.
Churchill-Milton Lumber Co., Louisville, Ky.
Thomas & Proetz Lumber Co., St. Louis, Mo.

GUMMERS, ETC.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Machinery Co. of America, Grand Rapids, Mich.

HAND PROTECTORS
Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND SCREWS
Fay & Egan Co., J. A., Cincinnati, Ohio.

HANDLE & SPOKE MACHINERY
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Whitney & Son, Baxter D., Winchendon, Mass.

HARDWARE
Acme Stamping & Tool Works, Hamilton, Ont.
Burns & Bassick Co., Bridgeport, Conn.
Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.
Laidlaw Bale Tie Co., Hamilton, Ont.
Vokes Hardware Co., Toronto.
Weber-Knapp Co., Jamestown, N.Y.

HARDWOOD LUMBER
American Hardwood Lumber Co., St. Louis, Mo.
American Oak Mfrs.' Assn., Memphis, Tenn.
Anderson-Tully Co., Memphis, Tenn.
Atlantic Lumber Company, Toronto.
Banning, Leland G., Cincinnati, Ohio.
Brown & Company, Geo. C., Memphis, Tenn.
Burns & Knapp Lumber Co., Conneautville, Pa.
Churchill-Milton Lumber Co., Louisville, Ky.
Clark & Son, Edward, Toronto, Ont.
Dermott Land & Lumber Co., Chicago, Ill.
Graves, Bigwood Company, Toronto, Ont.
Kersley, Geo., Montreal, Que.
Korn-Conkling Co., Cincinnati, Ohio.
Martin-Barriss Co., Cleveland, Ohio.
Paepcke Leicht Lumber Co., Chicago, Ill.
Payson Smith Lumber Co., Minneapolis, Minn.
Pickrel Walnut Co., St. Louis, Mo.
Probst Lumber Co., Cincinnati, Ohio.
Read Bros., Limited, Toronto.
Spencer, C. A., Montreal, Que.

HUB MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
Perrin & Company, Wm. R., Toronto, Ont.

JOINTERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

KNIVES (Planer and others)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

LATHES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Defiance Machine Works.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.

LUMBER
Aberdeen Lumber Co., Pittsburg, Pa.
Acme Veneer & Lumber Co., Cincinnati, Ohio.
American Hardwood Lumber Co., St. Louis, Mo.
Anderson-Tully Co., Memphis, Tenn.
Banning, Leland G., Cincinnati, Ohio.
Barr-Holaday Lumber Co., Greenfield, Ohio.
Brown & Company, Geo. C., Memphis, Tenn.
Churchill, Milton Lumber Co., Louisville, Ky.
Clark & Son, Edward, Toronto, Ont.
Dermott Land & Lumber Co., Chicago, Ill.
Gillies Bros., Braeside, Ont.
Graves, Bigwood Company, Toronto, Ont.
Hartzell, Geo. W., Piqua, Ohio.
Huddleston, Marsh Mahogany Co., New York.
Korn-Conkling Company, Cincinnati, Ohio.
Long-Knight Lumber Co., Indianapolis.
Paepcke Leicht Lumber Company, Chicago, Ill.
Pauze, Wilfrid H., Montreal, Que.
Payson Smith Lumber Co., Minneapolis, Minn.
Pickrel Walnut Co., St. Louis, Mo.
Probst Lumber Co., Cincinnati, Ohio.
Read Bros., Limited, Toronto.
Shreiner Lumber Co., Pittsburgh, Pa.

MACHINE KNIVES
Canada Machinery Corporation, Galt, Ont.
Peter Hay Knife Company, Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

MITRE MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

MITRE SAWS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Simonds Canada Saw Co., Montreal, P.Q.

MULTIPLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Reynolds Pattern & Machine Co., Moline, Ill.

PANELS
Waetjen & Co., George L., Milwaukee, Wis.

PATTERN SHOP MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PERIOD MOULDINGS
Waddell Mfg. Co., Grand Rapids, Mich.

PLANERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Wallace & Company, Chicago, Ill.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PLANING MILL MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PRESSES (Veneer)
Canada Machinery Corporation, Galt, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Perrin & Co., Wm. R., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.

PULLEYS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Machinery Co. of America, Grand Rapids, Mich.

RED GUM LUMBER
Gum Lumber Manufacturers' Association.

RECORDERS (TIME)
International Time Recording Co., Toronto, Ont.
Signal Systems, Limited, Toronto, Ont.

RESAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

RIM AND FELLOE MACHINERY
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.

RIP SAWING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Sinker-Davis Company, Indianapolis, Ind.
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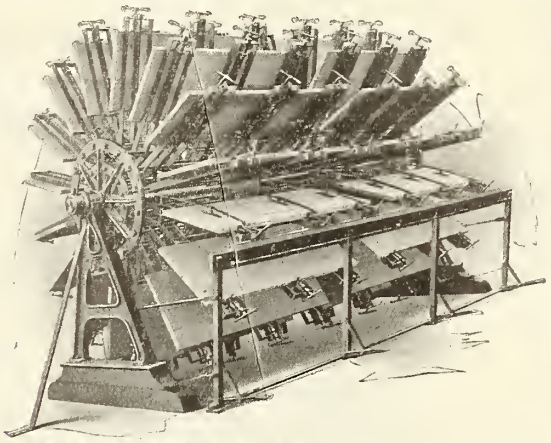
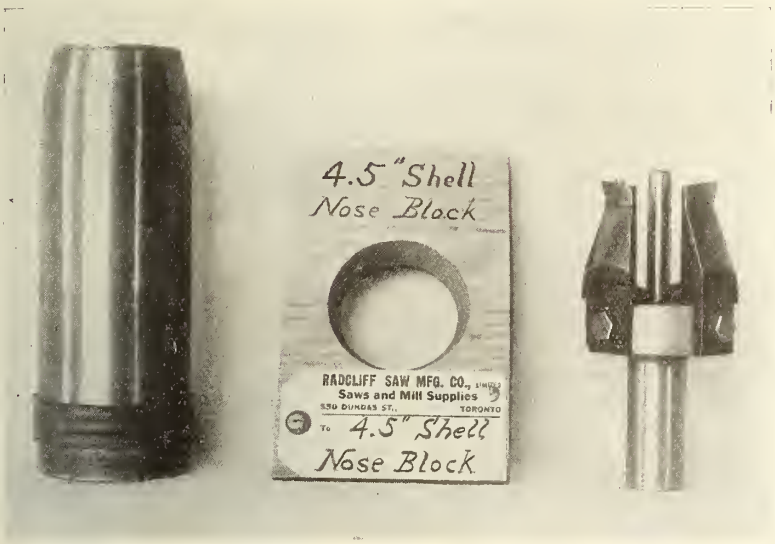


RADCLIFF CYLINDER SAWS
FOR SHELL BOXES



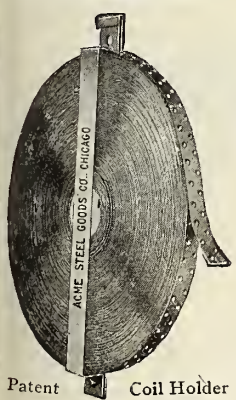
The illustration shows the special taper cutter used for the Nose blocks of the 4.5 in. and Bethlehem Boxes. These cutters will do quick smooth work and cut hole through and taper sides all in one operation. The kicker will eject the core. The shank can be made to fit any chuck over ¾ in. diameter, but we prefer to make them to fit over end of boring machine spindle where possible. Extra knives can be supplied to renew worn ones.

Get our prices.

RADCLIFF SAW MFG. CO., LIMITED
Agents for L. & I. J. White Co., Machine Knives

550 DUNDAS ST.
TORONTO, ONT.

"DOT EMBOSSED"
300 Foot Coil



Patent Coil Holder

STEEL BOX·STRAPPING

SMOOTH EDGES—CONTINUOUS LENGTHS
COIL HOLDERS SUPPLIED
LACQUERED—GALVANIZED——BRIGHT

Write now for Catalog.

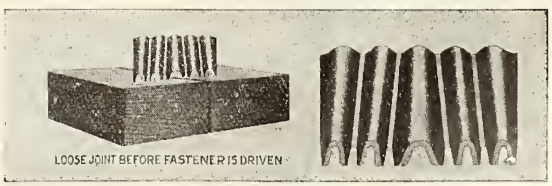
ACME STEEL GOODS CO.
OF CANADA, LIMITED
20 St. Nicholas St. MONTREAL, Que.

Corrugated Joint Fasteners

In bulk in Barrels and Boxes.

In coils for Automatic Driving Machines.

PARALLEL SAW EDGE



DIVERGENT SAW EDGE

"Canadian Woodworker" Buyers' Directory—Continued

SAFETY DEVICES
Gustafson & Scott Mfg. Co., Chicago, Ill.

SANDERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Nash, J. M., Milwaukee, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SASH, DOOR & BLIND MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SAWS
Atkins & Co., E. C., Indianapolis, Ind.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Radcliff Saw Mfg. Company, Toronto, Ont.
Shurly-Dietrich, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Smith Co., Ltd., R. H., St. Catharines, Ont.

SAW GUMMERS, ALOXITE
The Carborundum Co., Niagara Falls, N.Y.

SAW SWAGES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Machinery Co. of America, Grand Rapids, Mich.
Simonds Canada Saw Co., Montreal, Que.

SAW TABLES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SCRAPING MACHINES
Canada Machinery Corporation, Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass

SCREW DRIVING MACHINERY
Canada Machinery Corporation, Galt, Ont.
Reynolds Pattern & Machine Works, Moline, Ill

SCROLL SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

SECOND-HAND MACHINERY
Cowan & Co., Galt, Ont.
Petrie, H. W.
Wayne Machinery Co., Fort Wayne, Ind.

SHAPERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Whitney & Sons, Baxter D., Winchendon, Mass
Yates Machine Co., P. B., Hamilton, Ont.

SHARPENING TOOLS
The Carborundum Co., Niagara Falls, N.Y.

SHAVING COLLECTORS
Sheldons Limited, Galt, Ont.

SHOOK BUNDLER
Neilson & Company, J. L. Winnipeg, Man.

SPRINGS FOR UPHOLSTERY
Foster Bros. Mfg. Co., Utica, N.Y.

STAINS
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.
Schmidt, Walter K., Grand Rapids, Mich.

STEAM APPLIANCES
Darling Bros., Montreal.
Morrison Brass Mfg. Co., Toronto, Ont.

SINGLE SPINDLE BOXING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

STAVE SAWING MACHINE
Whitney & Sons, Baxter D., Winchendon, Mass

STEAM TRAPS
Canadian Morehead Mfg. Co., Woodstock, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

STEEL BOX STRAPPING
Acme Steel Goods Co. of Canada, Ltd.

STEEL SHELL BOX BANDS
Acme Steel Goods Co. of Canada, Ltd.

SURFACERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

SWING SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

TABLE LEG LATHES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Mattison Machine Works, C., Beloit, Wis.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

TABLE SLIDES
Walter & Co., B., Wabash, Ind.

TENONING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

TRANSMISSION MACHINERY
Dodge Mfg. Co., Ltd., Toronto, Ont.

TELEPHONES—PRIVATE SYSTEMS
Signal Systems, Limited, Toronto, Ont.

TRIMMERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

TRUCKS
Gray-Dort Motors, Chatham, Ont.
Sheldons Limited, Galt, Ont.
National Dry Kiln Co., Indianapolis, Ind.

TURNING MACHINES
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Mattison Machine Works, C., Beloit, Wis.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

UNDER-CUT SELF-FEEDING FACE PLANER
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

VARNISHES
Ault & Wiborg Company, Toronto, Ont.

VARNISH SPRAYERS
DeVilbiss Mfg. Co., Toledo, Ohio.

VENEERS
Acme Veneer & Lumber Co., Cincinnati, Ohio.
Barnaby, Chas. A., Greencastle, Ind.
Central Veneer Co., Huntington, W. Virginia.
Clark Veneer Co., Walter, Grand Rapids, Mich.
Empire Veneer Company, Chicago, Ill.
Hartzell, Geo. W., Piqua, Ohio.
Hoffman Bros. Company, Fort Wayne, Ind.
Geo. Kersley, Montreal, Que.
Nartzik, J. J., Chicago, Ill.
Ohio Veneer Company, Cincinnati, Ohio.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Roberts Veneer Co., New Albany, Ind.
Toronto Veneer Company, Toronto, Ont.
Waetjen & Co., George L., Milwaukee, Wis.

VENEER TAPE
Ideal Coated Paper Co., Brookfield, Mass.

VENTILATING APPARATUS
Sheldons Limited, Galt, Ont.

VENEER JOINTERS
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.

VENEER PRESSES (Hand and Power)
Canada Machinery Corporation, Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Perrin & Company, Wm. R., Toronto, Ont.

VISES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Company, Montreal, Que.

WAGON AND CARRIAGE MACHINERY
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

WATCHMAN'S CLOCKS
Signal Systems, Limited, Toronto, Ont.

WOOD FINISHES
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

WOOD PRINTING PRESSES
Hooper Co., F. X., Glenarm, Md.

WOOD PULLEYS
Dodge Mfg. Co., Ltd., Toronto, Ont.

WOOD TURNING MACHINERY
Canada Machinery Corporation, Galt, Ont.
Defiance Machine Works, Defiance, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Waymoth & Co., A. D., Fitchburg, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

WORK BENCHES
Fay & Egan Co., J. A., Cincinnati, Ohio.

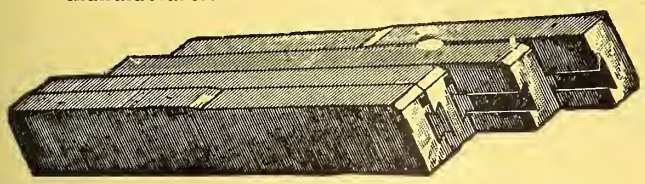
WOOD TURNINGS
Toy Products Co. of Canada, Farm Point, Que.

WOODWORKING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Elliot Woodworker Limited, Toronto, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Reynolds Pattern & Machine Works, Moline, Ill.

WHEELS, Grinding, Carborundum and Aloxite
The Carborundum Co., Niagara Falls, N.Y.

Making TABLE-SLIDES is a Specialty Business

For more than TWENTY-FIVE YEARS we have made TABLE SLIDES exclusively. Our Factory is equipped with Special Machinery which enables us to make SLIDES,—BETTER and CHEAPER than the furniture manufacturer.



Canadian Table makers are rapidly adopting WABASH SLIDES

Because { They ELIMINATE SLIDE TROUBLES / Are CHEAPER and BETTER

Reduced Costs / **Increased Out-put** { BY USING **WABASH SLIDES**

MADE BY

B. Walter & Company

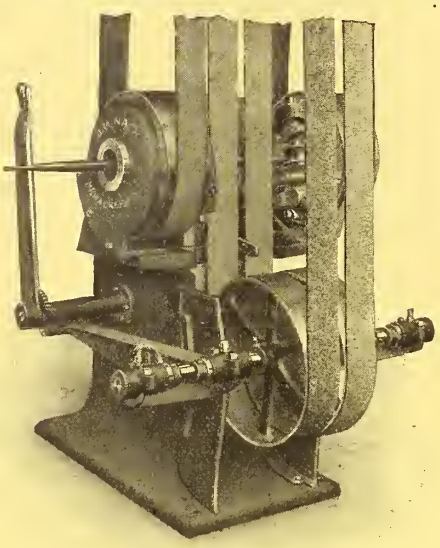
Wabash, Ind.

The Largest EXCLUSIVE TABLE-SLIDE Manufacturers in America

ESTABLISHED-1887

RELEASE YOUR MEN FOR

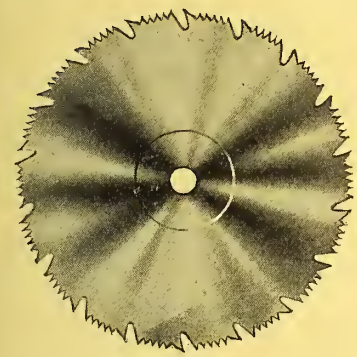
HIGHER DUTIES



The Nash Sander can help mightily in the solving of your labor problem.

It can do the work of **5 men.**

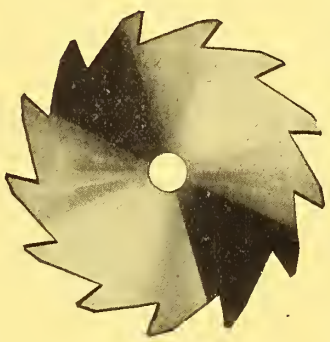
J. M. NASH, MILWAUKEE, Wis.



ATKINS

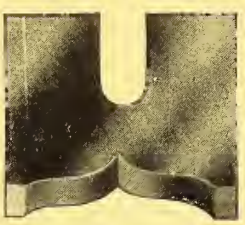
STERLING QUALITY

SAWS and KNIVES



The best steel—the most careful and accurate workmanship—the equipment that will eventually save you money.

Atkins Sterling Quality Saws and Knives are proving their superiority by competitive tests in the largest plants of the country. We welcome your most careful investigation, as we know the satisfaction that will result.



Write to-day for our Knife Booklet "C W" and Pattern Template Paper.

E. C. ATKINS & CO.

Makers of Sterling Saws

Factory—HAMILTON, Ont. **Vancouver Branch—109 Powell Street**

---for Turning Cabriole Legs

The MATTISON LATHE NO. 210

HERE'S the new method we have devised for shaping all patterns of Cabriole legs. It is automatic, and does the work in one operation.

This machine must not be confused with the ordinary copying lathe, generally used for axe-handle turning, etc. While the general working principle is similar, the details of construction on our machine have been designed to make its operation meet the particular needs of furniture work.

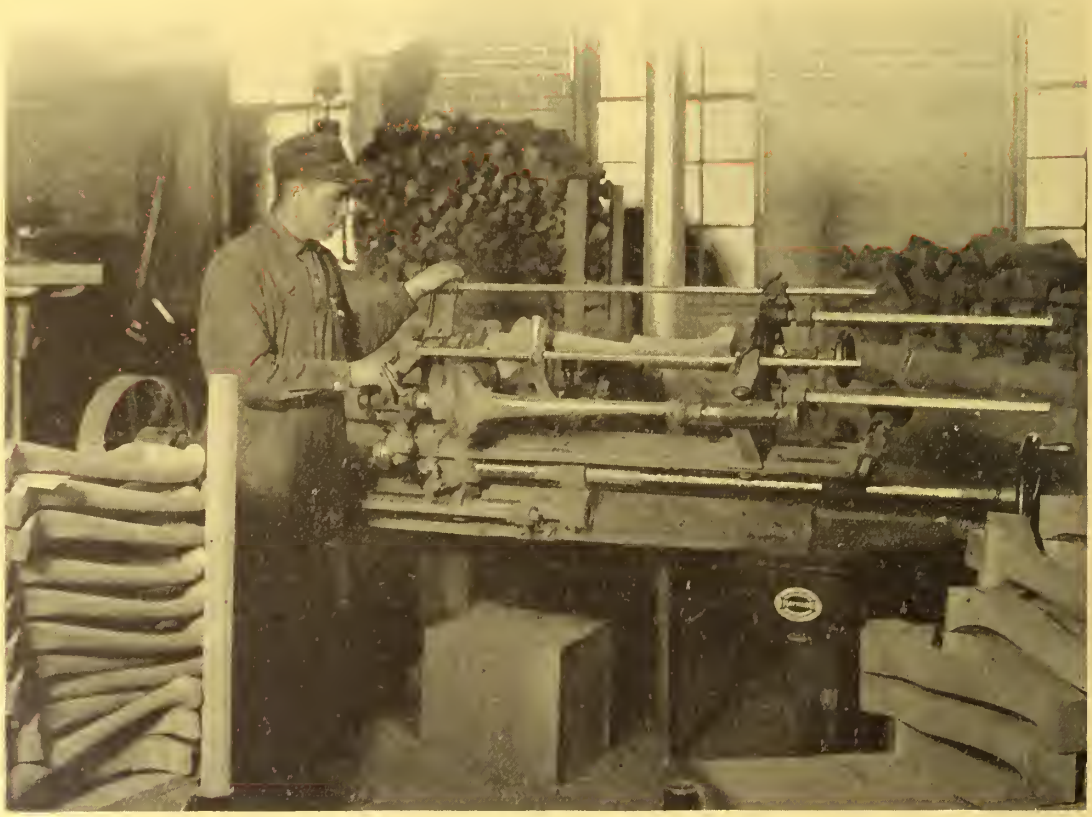
Since the popularity of the Cabriole leg has been established there is no longer a question of whether to make them. The problem now is how to produce them economically and in quantities.

When the July Manufacturing Season opens, therefore, there will be a big demand for these lathes,—and consequently delivery will be uncertain.

So if you are interested in the manufacturing possibilities of the "210," now is the time to investigate. Get your order in early, if you would be protected on delivery.

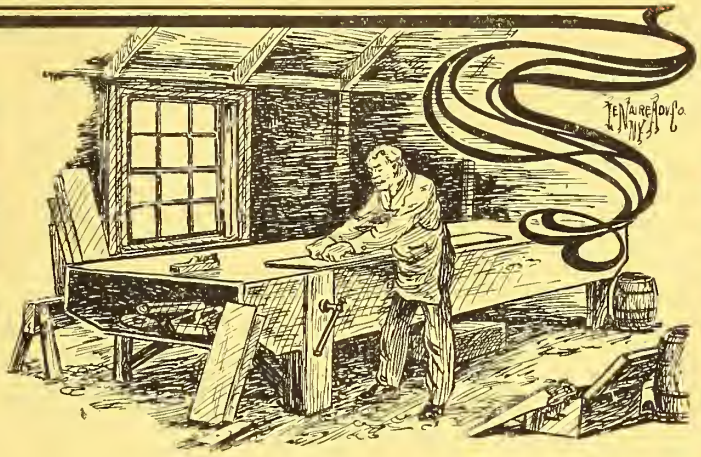
C. MATTISON MACHINE WORKS

883 Fifth Street BELOIT, WISCONSIN



Volume Seventeen TORONTO, AUGUST, 1917 Number Eight

CANADIAN WOODWORKER and Furniture Manufacturer



CRAPING Flat Hard Wood Surfaces, Solid or Veneered on a

WHITNEY Wood Scraping Machine

is a faster process;—costs are lower and results better than you can obtain by any other means or method—sanding or hand scraping.

¶ Ask us for some samples of hard woods passed through a Whitney Scraper so that you can see the beautiful grain effects—the open pores of the wood—the smooth even surface without scoured out spots and rounded corners.

¶ Or, better still, send us some samples of the woods you are working and compare the finish of Whitney Scraper work we send you with the work you do by your method.

¶ The low cost of operating a Whitney Scraper and the speed at which it works are worth considering. ***Write us about it***

BAXTER D. WHITNEY & SON, Winchendon, Mass.

H. H. Plummer & Co.
451-453 Monadnock Bldg.,
San Francisco, Cal.

Canadian Representatives:
H. W. Petrie, Limited,
Toronto, Ontario

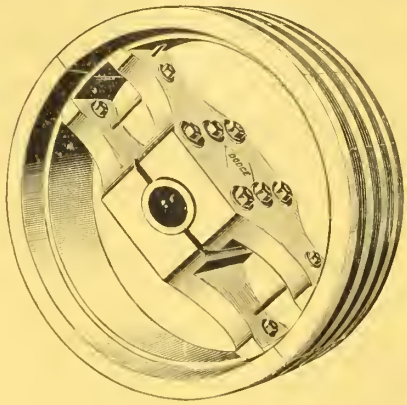
Alphabetical Index to Advertisers, Page 10

PULLEYS

No Keys

No Set Screws

In Perfect Balance



Lighter

Stronger

Better Belt Surface

The Dodge Standard Wood Split Pulley

The Wood Split Pulley is better than either cast iron split pulleys or steel split pulleys for the following reasons—

The wood pulley is lighter, stronger, better balanced and provides a very much better belt surface. It costs 33 1-3% less money and provides 50% more returns in horse-power value. It may be run at very much higher speeds with no danger of bursting—also it may be had quicker and in a greater range of sizes.

It costs less to get—less to put on—and less to keep.

We make approximately 300 Dodge pulleys every day—everybody uses them.

There are more Dodge pulleys making ammunition than any other kind—you can get them quick.

Every pulley is thoroughly nailed. Every pulley is guaranteed for Double Belts.

We are Canada's greatest pulley makers.

If you have not our Books, write us

DODGE MANUFACTURING COMPANY

Toronto - - Montreal

GARLOCK-WALKER MACHINERY CO. LIMITED

32 FRONT ST. WEST, **TORONTO** TELEPHONE MAIN 5346

Mr. Box Manufacturer,

Have *you* utilized our services in your plant layout or equipment?

Included in the firms who have, are:

Toronto Furniture Company, Limited, Toronto.
Henry Morgan Company, Montreal.
Office Specialty Company, Newmarket.
W. C. Edwards Company, Ottawa.
and many others.

RESULTS:—

To Munition Board:—Increased Production—Prompt shipments.
To our customers:—Greater production, continued orders, more profits.
To us:—Satisfied customers—more business.

Tell us your troubles—Let us help *you*

Section of the Plant of Toronto Furniture Company.
Shell Box Equipment furnished by

Garlock-Walker Machinery Company, Limited

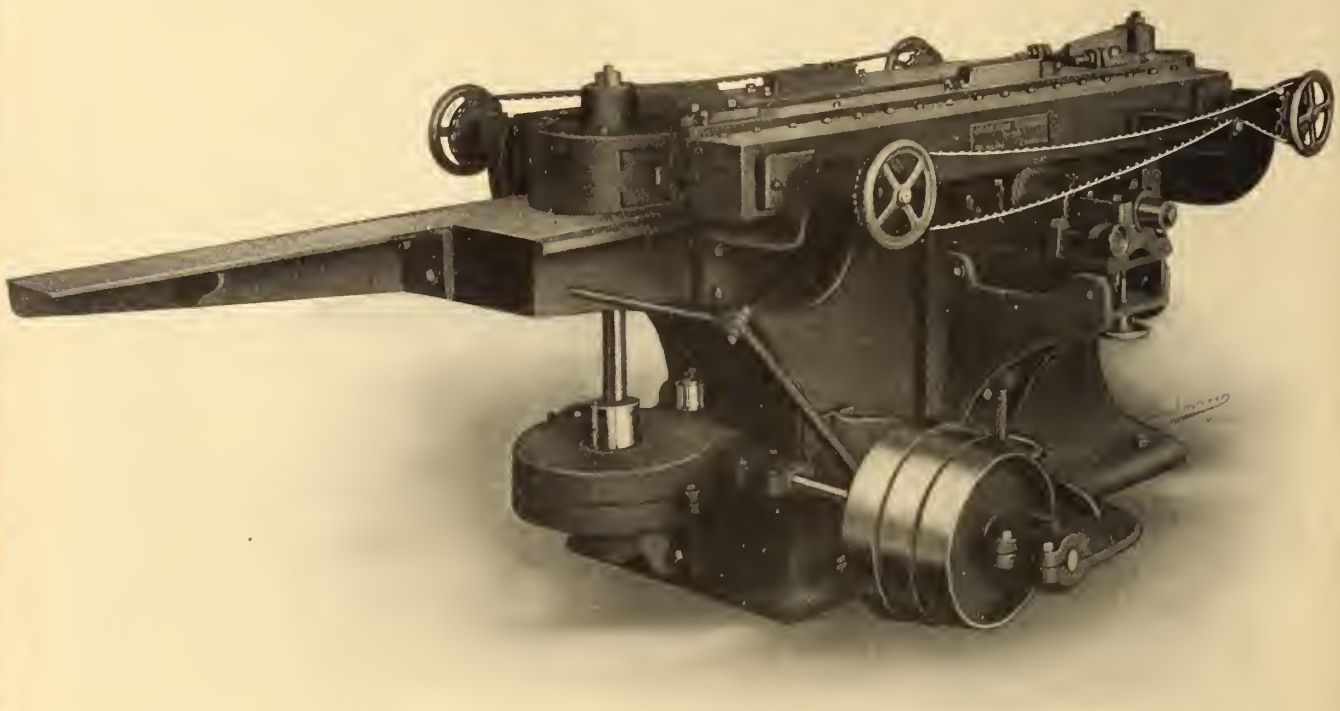
32 Front Street West, Toronto, Ont.

METAL and WOODWORKING MACHINERY of all Kinds

Will do the work of Five Hand Jointers in making Glue Joints

This is the guarantee given with our

No. 4 Continuous Feed GLUE JOINTER

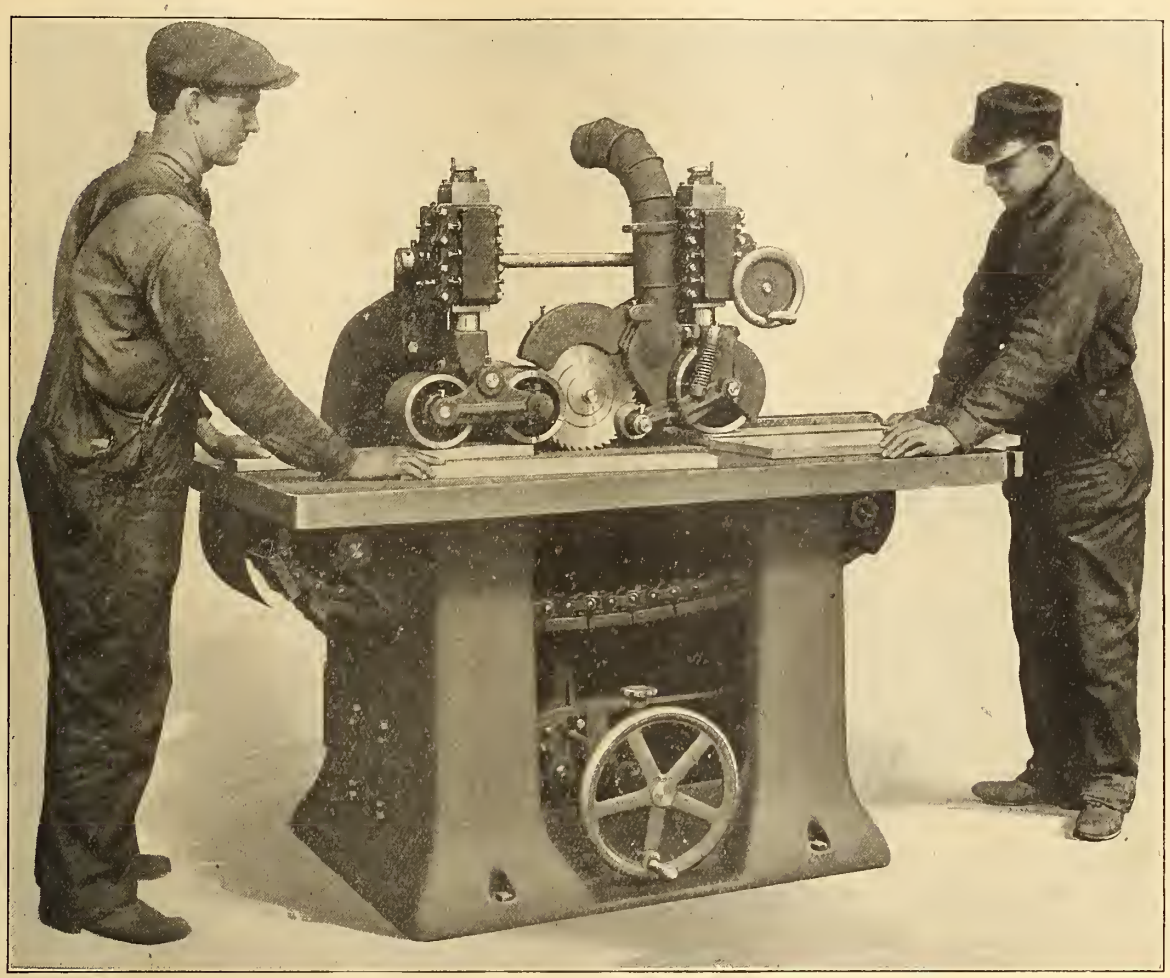


Strongest and most complete machine on the market.
Any part may be readily removed or renewed.
Feeds in opposite direction, giving 100 feet per minute.
Works material from six inches up to any length desired.
Also from one quarter to 3 inches thick, and from three-quarters of an inch wide up to any width.
1 set Shimer Special Jointer Heads supplied with machine.

Investigate the merits of this machine—it will pay you!

Jackson, Cochrane & Company

KITCHENER, ONTARIO



Invariably Straight Ripping Without Effort

All the time an operator spends holding stock to a straight line saw cut is lost production. Lost production is lost profit. Under present high-cost conditions manufacturers cannot afford to overlook any means that will save loss in production. Any machine that will save the time of even one man has added that man's wages to the manufacturer's profits.

The Yates Edging and Ripping Saw

adds the time of several men. The fact that the operators need only to feed the stock and take it away from the machine saves for productive effort all the time lost with hand-feed saws. It is not necessary to hold the stock in the cut. The automatic chain feed takes care of that so perfectly that a straight saw cut invariably results. If the Yates Edging and Ripping Saw saved the wages of only one skilled man a year it would pay for itself in that time. But it does more. It pays for itself in a few months, and then begins to pile up profits. That's the experience of owners all over the country.

Send for our free "Circular G-2." Tells all about the Yates Edging and Ripping Saw.

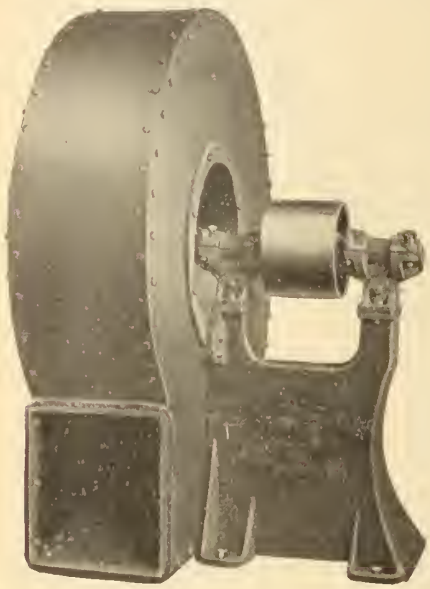
P. B. Yates Machine Company Ltd.

HAMILTON, ONT. CANADA

"CANADIAN"

Slow Speed

Mill Exhausters



How much does it cost you to handle your shavings, sawdust, bark, smoke, gases, fumes, etc.

Buffalo Slow Speed Reversible Mill Exhausters will save you 15 to 25 per cent.

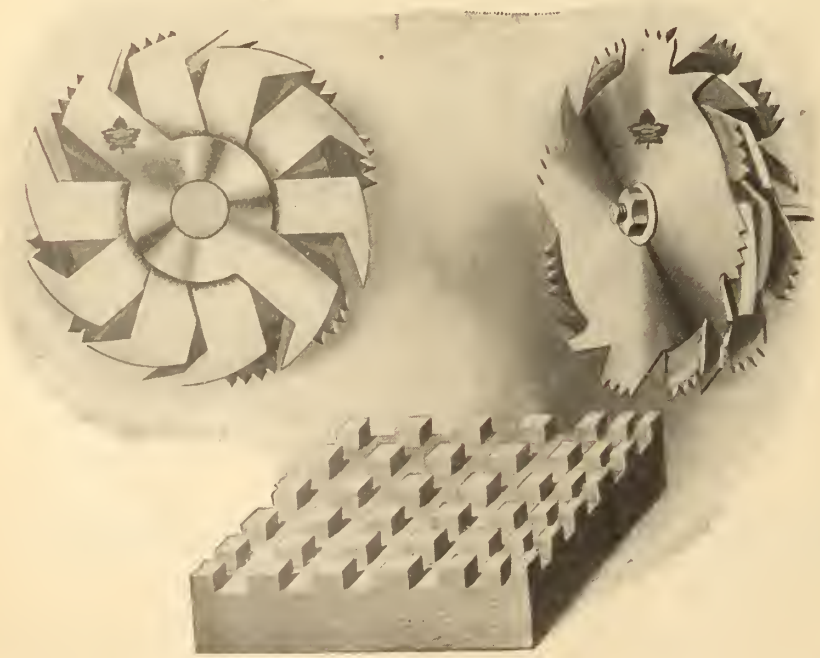
They are specially designed to do the work required—note the blast wheel for handling long, stringy material.

Our engineering department will be glad to help you at any time—and without obligation to you—also be sure to get catalog 256-13.

Canadian Blower and Forge Co., Ltd.
Kitchener, Ont.

It Pays to Use

"Maple Leaf" Saws



We manufacture—
Bands,
all kinds of
Special Circular Saws
for Special work,
Cross Cut Saws,
Gang Saws,
Grooving Saws,
Chamfering Saws,
Concave Saws,
etc., etc.

EVERY SAW GUARANTEED.
Write for Catalogue

Shurly-Dietrich Co., Limited
GALT — CANADA
Vancouver, B.C. Hull, Quebec

The "Shimer Limited" Expansion Head

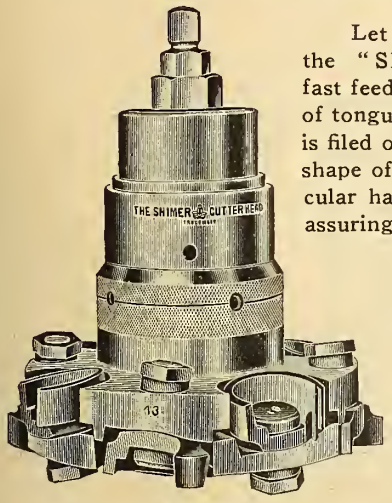


Fig. 627

Let us draw your attention to the advantages of using the "SHIMER CUTTER HEAD" for general Mill and fast feed Planer work. The Cutter is turned to cut the shape of tongue and groove desired, so that to sharpen the cutter it is filed or ground on its face, guaranteeing the user the same shape of cut during the life of the cutter. The bit being circular has from 3½ in. to 5 in. cutting length to the cutter, assuring long wearing life to the cutters.

Note that the cutter, being fastened to a concave seat on a compound angle, assures the user of the proper clearance of cutters, consequently they never burn.

These heads are fitted with or without the Self-Centering Sleeve, and made Expansion or Solid, to suit the customer's wishes.

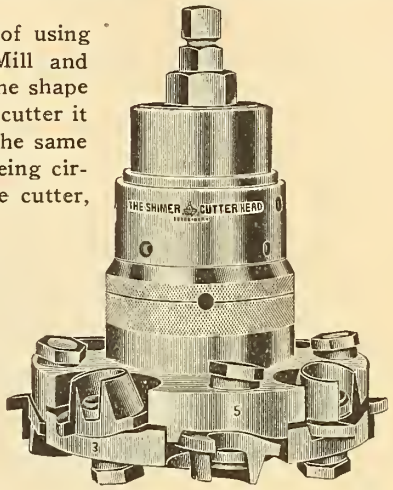


Fig. 268

Shimer Heads have been in use for sixty years, and their reliability and reputation have spoken for them in the past. Let us know your wants and we will guarantee their reliability at the present.

SHIMER CUTTER HEAD CO. OF CANADA, LIMITED

Successors to Samuel J. Shimer & Sons, Inc.

GALT, ONTARIO

The New Hoosier Self-Feed Rip Saw

This is our Standard or No. 1 Hoosier Self Feed Rip Saw, which is now built with hinged upper feed works so that they can be quickly and easily raised up out of the way and the machine used for hand-feed work.

The machine is capable of ripping as thick as 6 in. and as wide as 20 in., and can be used for single, gang, or bevel ripping, the feed being strong enough to pull six saws through 1 in. stock. Four rates of feed are provided from 35 to 150 ft. per minute.

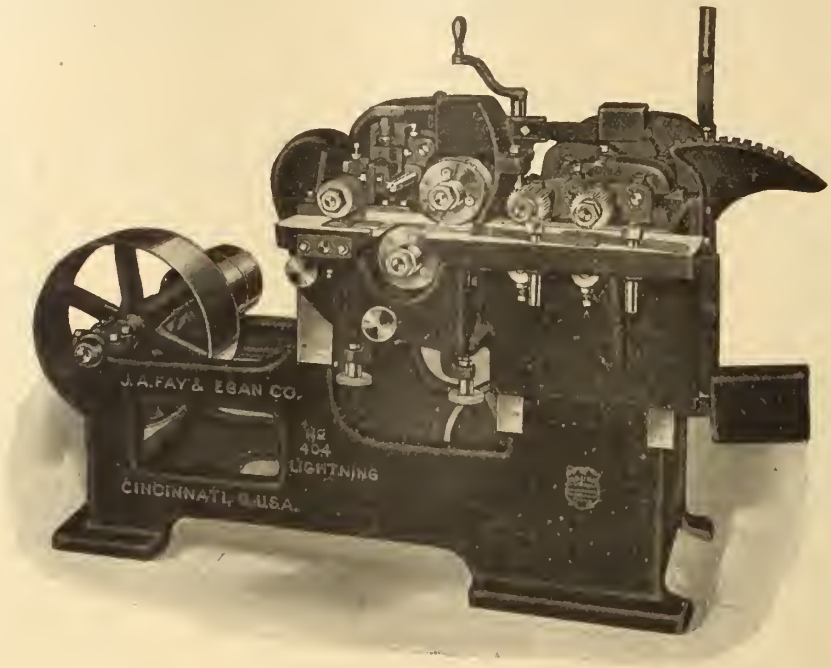
To take care of special ripping problems we build Hoosier Rip Saws in seven other styles.

For further information address

The—

Sinker-Davis Company

INDIANAPOLIS, IND.



A NEW MACHINE FOR MAKING PENCILS, SKEWERS, DOWELS, AND ESPECIALLY *FLAG STICKS.*

PENCILS — Stock of foreign made pencils, imported before the war, are exhausted—a new supply must be manufactured. This machine makes the wood part, round, hexaround or hexagon.

SKEWERS — Always in big demand—a good staple product—made on a No. 404.

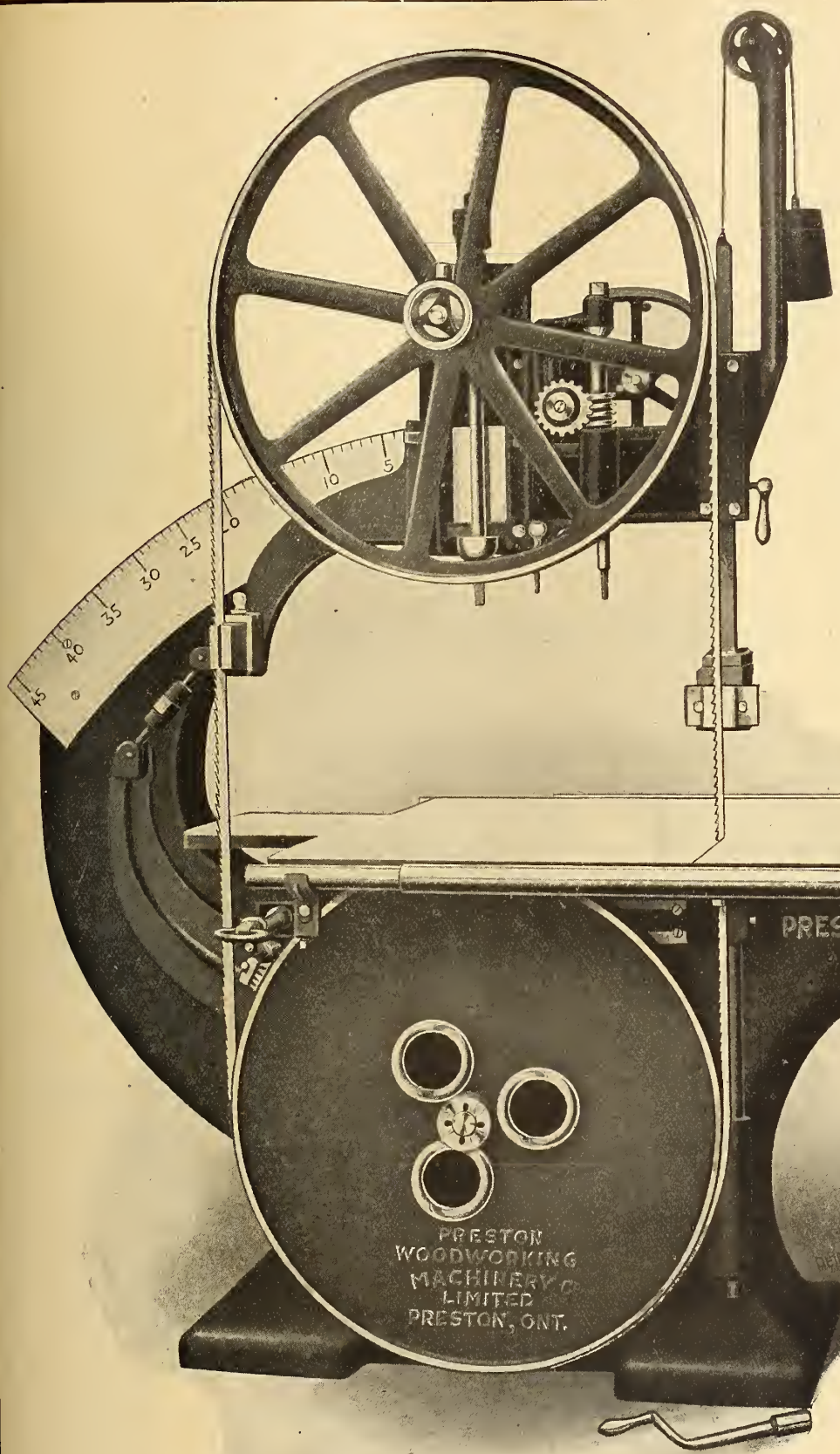
DOWELS—More used now than ever—big demand for use in wood ship and small boat construction — No. 404 makes them.

FLAGSTICKS — Right now stocks are completely exhausted—big demand unsatisfied—market will continue strong—No. 404 the only real flag-sticker made.

This is a new big production machine — Get one now—It will pay you well—Ask for Bulletin E-15.

J. A. FAY & EGAN CO.

153-173 W. Front Street CINCINNATI, OHIO



Canadian Shipbuilders

Ask us for a circular of this machine, built specially for your needs.

Built absolutely on honor and the most up-to-date machine of its kind made to-day.

It will appeal to the small shop as well as to the large. The price is right, and it will mean for you a tremendous saving in labor as well as a wonderful increase in production.

For good delivery, write us at once, as we have sold considerable already.

No. 133 Preston Adjustable Ship Band SAW

HAND FEED MACHINE
Wheels 42″ Diameter
Angles 45° to Left and 10° to Right

FOR POWER FEED MACHINE, SEE CIRCULAR NO. 134

The Preston Woodworking Machinery Co. Limited - Preston, Ont.

SALES AGENTS: A. R. WILLIAMS MACHINERY COMPANY, ST. JOHN, VANCOUVER AND TORONTO

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Edward Clark & Sons

Toronto

CANADIAN HARDWOODS—winter cut **Birch, Basswood, Maple**

Ontario and Quebec Stocks, East or West, rail or water shipment direct from mill to factory.

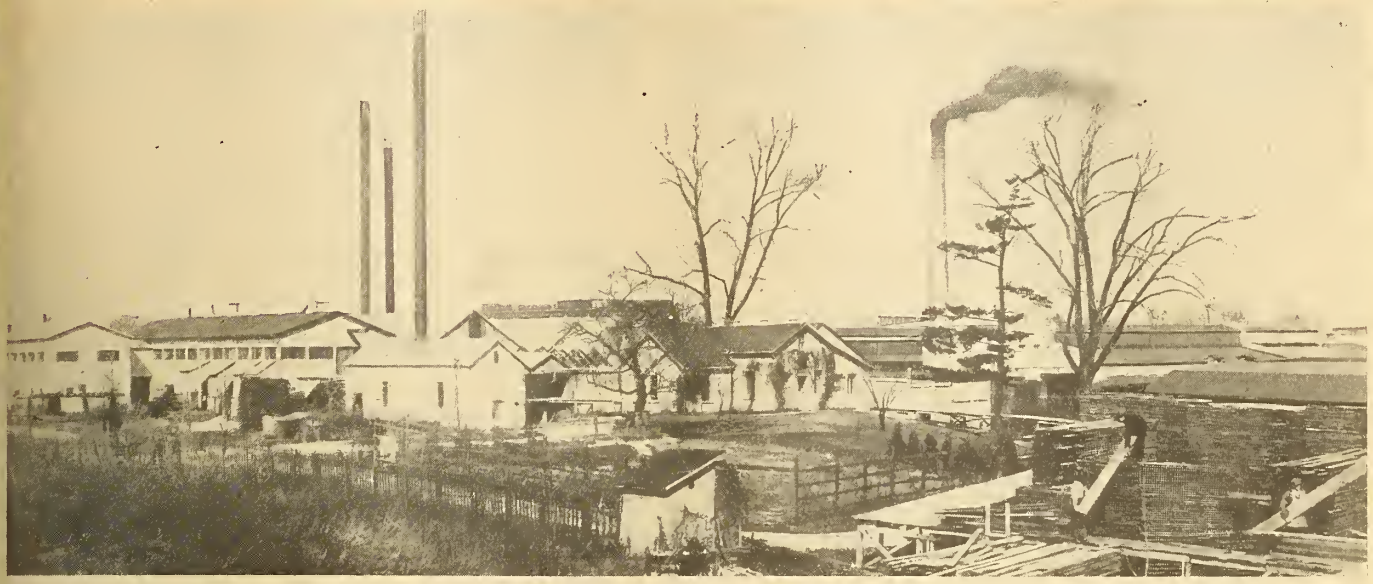
Let us quote you on:

5/4, 6/4, 8/4, 10/4 and 12/4 Birch

High grade 1sts and 2nds and No. 1 Common, running well to long lengths.

We Commend to Your Notice:

Our lumber is reliable, our grades uniform, our shipments prompt, and receive personal supervision; our prices consistent. We have had long experience. We desire to serve.



The Plant Behind the Service

This view shows a portion of our large modern plant, by means of which we are able to give you as close to one hundred per cent. efficiency in Service as we believe it is possible to obtain. With about one hundred and fifty cars of the choicest logs coming into our walnut mills regularly each month, we are in an excellent position to execute orders for

Walnut Lumber

Forty years' experience has earned for us the reputation of being able to furnish a class of Walnut that is unequalled. That is the reason why our trade is steadily increasing. "Hartzell" Service and Quality mean something. Large stock of all grades and thicknesses constantly ready for shipment.

We also manufacture highly figured **WALNUT VENEERS**, and make a specialty of Table Tops and Talking Machine Dimension Stock.

ASK US FOR PRICES

Geo. W. Hartzell, Piqua, Ohio

Specialist in Walnut Lumber and Veneers

Saint Francis Basin Band Sawed Oak

Soft Textured, Evenly Colored, Red and White

GET THE THRIFT OF LUMBER BUYING

It is better to ***have*** *a car in transit than to* ***wish*** *you had*

We are Headquarters for

St. Francis Basin Kraetzer Cured Gum

Send us a list of your requirements. — Delivered Prices will be cheerfully quoted

GEO. C. BROWN & CO.

Mill—PROCTOR, Ark. **Main Office—MEMPHIS, Tenn.**

We specialize in Tennessee Aromatic Red Cedar

It is much to the credit of the better class of furniture manufacturers that they are now lavishing their worthiest designing on

RED GUM

("AMERICA'S FINEST CABINET WOOD")

RED GUM Furniture Makers have MADE A BIG HIT WITH THE WISER DEALERS, *just as furniture aealers have pleased their most discriminating customers* in putting on the market a wide range of beautifully designed and conscientiously manufactured pieces of RED GUM furniture. RED GUM is no longer identified only as a low price product. Its growing favor with the very best and most critical trade completely justifies the foresight of the industry. RED GUM FURNITURE *is now* THE FASHION. *Are YOU taking full advantage of this fact?*

Neither are up-to-date furniture *manufacturers* overlooking for a minute the wonderful value and applicability of SAP GUM to a hundred and one of their manufacturing requirements. When *properly* manufactured (as it is by the members of the undersigned Association) SAP GUM is *thoroughly reliable,* just as RED GUM is.

Let us send you the RED GUM literature and let us direct you to a group of buildings trimmed with RED GUM in your neighborhood.

Gum Lumber Manufacturers Association

1314 Bank of Commerce Bldg. **Memphis, Tennessee**

Dry Spruce and Birch

Good Stocks, Prompt Shipments, Satisfaction

C. A. SPENCER, Limited

Wholesale Dealers in Rough and Dressed Lumber

Offices—500 McGill Building
MONTREAL - - Quebec

Churchill Milton Lumber Co.

Louisville, Ky.

We carry at
NEW ALBANY, IND.

Genuine Indiana Plain and Quartered Oak, Poplar

At GLENDORA, MISS.

Cypress, Gum, Cottonwood, Oak

SEND US YOUR INQUIRIES

We have dry stock on hand and can make quick shipment

American Hardwood Lumber Co.

St. Louis, Mo.

Large stock of—

Dry Ash, Quartered Oak Plain Oak and Gum

Shipments from — NASHVILLE, Tenn., NEW ORLEANS, La., and BENTON, Ark.

Quarter Sawn Gum

One objectionable feature of Gum lumber is that it has a tendency to warp and twist. Another one is that the thicknesses heavier than inch will check badly in seasoning during some seasons of the year.

In spite of these objections Gum has grown into popularity, during the past few years, faster than any other American hardwood. The low cost, combined with the many excellent qualities of the wood, has increased the demand for Gum nearly 100 per cent. within five years.

It has been found that Quarter Sawing will prevent Gum from checking in seasoning and besides the lumber will dry straight and flat. Naturally the cost of manufacturing is somewhat increased thereby, but the benefits derived by the consumer more than offset the advanced price asked for Quarter Sawn lumber.

It is not the intention to saw for figure, although much beautifully mottled figure can be sorted out of Quartered Red Gum. The main object is to saw the log so that the majority of each board or plank will show grain running at an angle of 45 degrees or less.

The various lines of trade such as Furniture, Cabinet and Automobile factories, etc., require different grades and selections. To accommodate these special needs we saw and sort as follows:

Quarter Sawn Red Gum

Quarter Sawn Red Gum—Sap no defect

Plain Sawn Red Gum

Plain Sawn Red Gum—Sap no defect

We can furnish Quartered Sawn in both 1s and 2s and No. 1 Common Grades. The Plain Sawn is graded 1sts and 2nds, No. 1 Common and No. 2 Common. The thicknesses of the Quartered are 5/4, 6/4, 8/4, 10/4 and 12/4 inch. The thicknesses of the Plain Sawn are mostly 4/4, 5/4, 6/4 and 8/4 inch.

There is a decided difference in the method of different mills in Quarter Sawing Gum, as many consumers know. Very few sawyers understand turning their logs so as to produce a satisfactory degree of vertical and diagonal grain without wasting timber or producing a surplus of narrow widths. Others who attempt it only succeed in obtaining a limited percent that will pass for Quartered stock and the customer is consequently disappointed.

Our Percy, Mississippi Mill put into operation this year is supplied with every modern equipment for manufacturing high class lumber. Our cut at this mill is mostly Gum, and we are Quarter Sawing a good portion of our cut.

The price of Quartered Gum does add to the first cost to the consumer, but the results in most cases make the difference in price inconsequential.

The Korn-Conkling Co.

Cincinnati, Ohio

Dermott Offers You, Mr. Buyer:

QUARTERED WHITE OAK

3 cars 1 in. firsts and seconds.
1 car 1¼ in. firsts and seconds.
2 cars 1½ in. firsts and seconds.
1 car 2 in. firsts and seconds.
5 cars 1 in. No. 1 common.
2 cars 1¼ in. No. 1 common
1 car 1½ in. No. 1 common.
1 car 2 in. No. 1 common.

PLAIN WHITE OAK

10 cars 1 in. firsts and seconds.
4 cars 1¼ in. firsts and seconds.
2 cars 1½ in. firsts and seconds.
2 cars 1¾ in. firsts and seconds.
5 cars 2 in. firsts and seconds.
½ car 2½ in. firsts and seconds.
½ car 3 in. firsts and seconds.
5 cars 1 in. No. 1 common.
2 cars 1¼ in. No. 1 common.
1 car 1½ in. No. 1 common.
3 cars 2 in. No. 1 common.

PLAIN RED OAK

4 cars 1 in. firsts and seconds.
1 car 1¼ in. firsts and seconds.
1 car 1½ in. firsts and seconds.
5 cars 1 in. No. 1 common.
1 car 1¼ in. No. 1 common.
1 car 1½ in. No. 1 common.

PLAIN RED GUM

5 cars 1 in. firsts and seconds.
2 cars 1¼ in. firsts and seconds.
1 car 1½ in. firsts and seconds.
5 cars 1 in. No. 1 common.
2 cars 1¼ in. No. 1 common.
2 cars 1½ in. No. 1 common.

SAP GUM

7 cars 1 in. firsts and seconds.
2 cars 1¼ in. firsts and seconds.
2 cars 1½ in. firsts and seconds.
1 car 2 in. firsts and seconds.
5 cars 1 in. No. 1 common.
1 car 1¼ No. 1 common.
1 car 1½ in. No. 1 common.
1 car 2 in. No. 1 common.

Will be pleased to name you prices on any items in Southern Hardwoods. If you require well-manufactured stock, containing good widths and lengths, we can serve you.

DERMOTT LAND & LUMBER COMPANY

General Offices 1559 Railway Exchange Bldg. CHICAGO, ILL.

Band Mill and Yards—DERMOTT, Ark.

STILL ANOTHER OAK FURNITURE ADV. APPEARING IN THE BEST MAGAZINES IN AMERICA

& YET AGAIN

here's proof that we are not only PULLING FOR GOOD OLD

OAK

but also *for those WHO SELL IT—*

IS THIS YOU?

Month by month we are working on the CONSUMER (*Your Customer*) for a big, strong "COME-BACK"

of OAK!

Watch us!

Does your line meet the issue? If not, it can by next season.

OAK, as a CABINET WOOD, is serene in its conscious superiority. Responsive alike to the best skill of the artisan and the artist, OAK combines all the qualities which contribute most to a home whose FURNITURE must (because of the little folks) at the same time impart ideas of beauty, dignity, poise and permanence—and good-naturedly repel the onslaughts of buoyant youth.

no finer heirloom than good OAK furniture."

fe and *enduring* investment—none bet

AMERICAN OAK MFRS' ASSN.,

LET US CONSULT TOGETHER FOR THE GOOD OF ALL CONCERNED. WRITE US. WE'LL ANSWER.

ROOM 1408, 14 MAIN STREET, MEMPHIS, TENNESSEE

"All that the Word Implies"

We have endeavored to build up an organization which will insure service to our customers, and will make the term, used in connection with the business of Penrod, Jurden & McCowen, really significant. This is our idea of

"PJM SERVICE"

Scientific Drying **Expert Manufacturing**
Good Timber **Modern Mills**
Satisfaction to the Buyer

Southern Rotary Veneers and Hardwood Lumber

We can take care of your requirements in Southern woods, no matter whether you are in the market for veneers or lumber. Our big Rotary Veneer Mill at Helena, Ark., has exceptionally large units, and can readily supply sizes which are ordinarily difficult to produce. Our lumber mills are cutting some of the finest hardwood stock ever manufactured in America. Tell us what you want—we can supply you.

On account of car shortage, which affects delivery of logs to the mills as well as shipments of veneer—we urge all buyers of veneers to place requirements at least 60 to 90 days in advance.

PJM **Penrod, Jurden & McCowen** (Incorporated) PJM

General Offices, MEMPHIS, TENN.
Bank of Commerce Building

"Penrod Service"

Our many Canadian customers know what "Penrod Service" means in its application to **AMERICAN WALNUT.** This service is the result of over thirty years' specialization. The business we have built up is a big factor in providing this service.

We have large stocks of the choicest timber, a factory with a big capacity, and, what is most important, we cut nothing but American Walnut.

When it comes from Penrod, it's right. If you are not a customer, remember that when you are in the market for Walnut Veneers, or Lumber, either plain or figured.

Next month we will show a view of some standing timber we are now starting to cut. You will be interested.

Penrod Walnut & Veneer Co.

Kansas City, Mo.

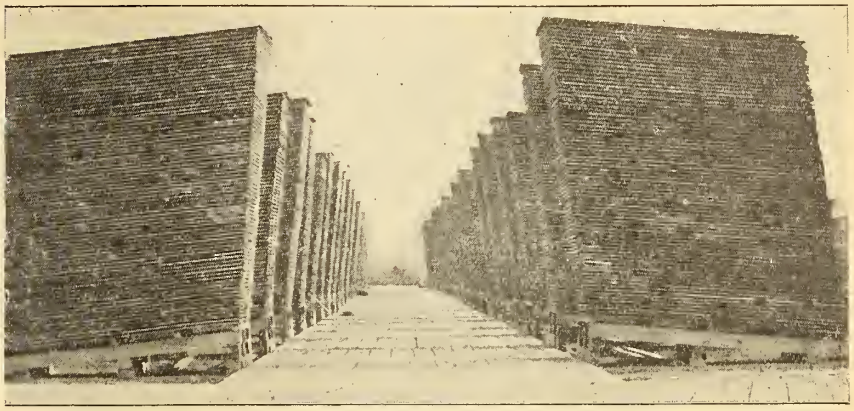
A view which shows the class of logs we are obtaining to supply our customers' needs in Walnut.

This log is one of the best that has been produced in the Central States and a number of experts on Walnut have judged the stump to be the best figured stump that has been produced in years.

Pickrel Walnut Co.

St. Louis, Mo.

Two Conclusive Proofs Why You Should Buy Your Lumber From Us



Examine closely the picture above, then read the following letter we received a few days ago from one of the largest manufacturers of Mouldings in the world. (Lumber for Mouldings must be absolutely flat and straight.)

"We have been using exclusively gum lumber, both sap and red, shipped by you for the last three years, and have been well pleased with its character, both as to grade and condition. The condition of same being an evidence of careful handling before shipping. We have been well pleased with the transactions which we have had with you, and will endeavor to continue using your stock as long as available."

We also manufacture Oak, Ash, Elm, and Cypress at Louise, Miss., mills. Get our prices before placing your orders and become a SATISFIED user of Gum or one of the other Southern hardwoods.

BARR-HOLADAY LUMBER CO.

GREENFIELD - OHIO

We want your ORDERS for CABINET WOODS:

Walnut
Mexican Mahogany
Quartered White Oak (fine figure)
Plain White Oak (soft texture)
Ash, Cherry, etc.

Our prices are right—have a complete stock—can ship immediately.

Canadian Representative:
A. E. KLIPPERT
11 Laxton Ave., TORONTO
Phone Parkdale 1354

LELAND G. BANNING

CINCINNATI, OHIO

MAHOGANY
of
CHARACTER

M B

Martin-Barriss hardwoods offer something new in the way of service This is particularly true of our thoroughly kiln-dried mahogany. If you require mahogany of character, possessing any particular figure, we are prepared to cut into log after log to obtain that figure.

Ask us about our service and prices

The Martin-Barriss Co.
Cleveland, Ohio

The Atlantic Lumber Co.

Manufacturers

Strictly Soft Textured

Quartered and Plain White Oak Red Oak

Chestnut, Poplar, Cherry

Tennessee Scented Red Cedar

High Grades—Quick Shipments

110 Manning Chambers Phone Main 6386 **- TORONTO**

HEAD OFFICE, BOSTON MASS.

Mills: KNOXVILLE, TENN., WALLAND, TENN. FRANKLIN, ARRINGDALE and BUTTERWORTH, VA.

SHELL
BOX and CRATING
LUMBER

We are now sawing on Spruce and Hemlock Lumber.
LET US HAVE YOUR INQUIRIES.

Read Bros., Limited
43 Victoria Street
Toronto -:- Canada

"Gum of Quality"
Yazoo River Red Gum

as produced by

Thomas & Proetz Lumber Company
3400 No. Hall St. St. Louis, Mo.

is carefully manufactured; soft in texture; dark, rich in color; and admirably suited for furniture and interior trim.

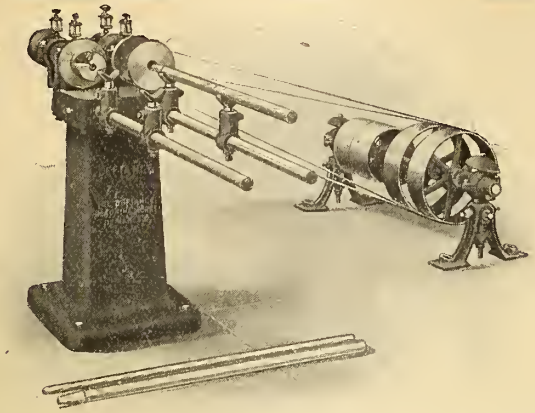
Mills—Belzoni, Miss.; Catchings, Miss.; Naples, La.

If you are not buying from us, write today.

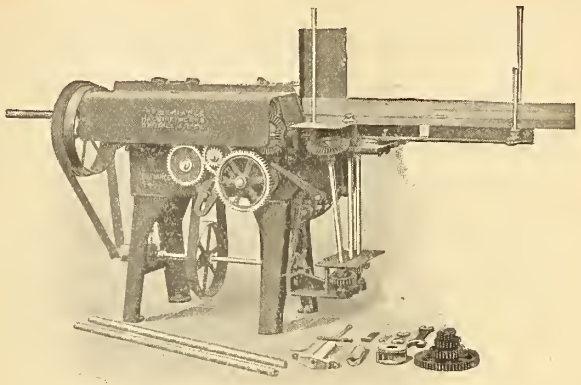
Galbraith & Co., Ltd.
Owen Sound, Ont.
Manufacturers of
"Well-Made" Wood Specialties
Toys, Games, Turned Goods and Kitchenware

We Specialize on
CUSTOMS TURNINGS

Your order will receive prompt attention



No. 2 Improved Double Spindle Chucking and Boring Machine



Chaplin Patent Automatic Handle Lathe

TO MAKE HANDLES ACCURATELY IN A CONTINUOUS FLOW AND AT LOW COST

is of vital importance to manufacturers of long handles, such as are used for brooms, rakes, forks, hoes and similar farming tools, curtain, pike and flag poles—either straight, tapered or swelled. Defiance high productive handle machinery enables a manufacturer to fill large contracts promptly and profitably. Its big daily output largely offsets labor shortage and the high cost of raw materials.

Defiance Handle Making Machinery

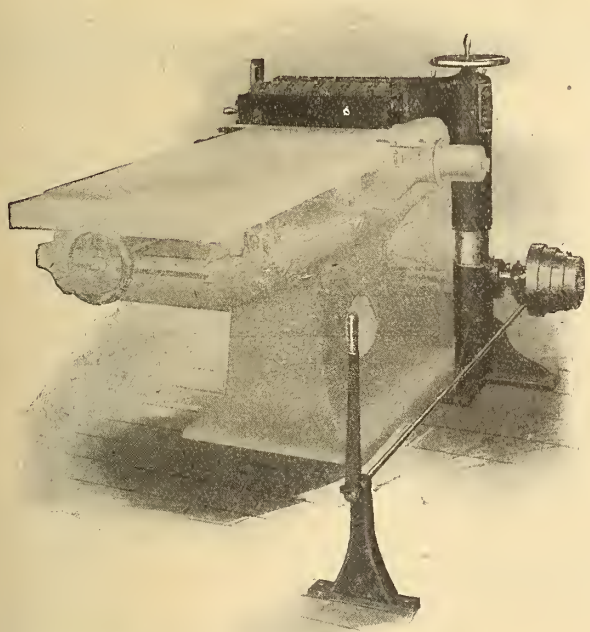
is a proven success, so pronounced and so continued as to leave no reasonable doubt in the mind of the purchaser as to its superior merit. We build machines to make handles of every description, including those used on small tools, hammers, hatchets, picks, axes, mauls, shovels, plows, etc.

Descriptive matter and quotations on your requirements will be mailed upon request.

THE DEFIANCE MACHINE WORKS

New York City DEFIANCE, OHIO, U.S.A. **London, Eng.**

THE POWER FEED DOES THE BUSINESS



The Falls No. 73
Power Feed Attachment

attached to any Hand Jointer increases its daily output by four times, in taking the wind out of stock.

When you wish to use the Hand Jointer for other purposes the Attachment can instantly be swung out of the way.

Stop and Think What This Means to You

This machine will be displayed at the Canadian National Exhibition at Toronto, from August 25 to September 10

Manufactured by—

Falls Machine Co.
Sheboygan Falls - Wis., U.S.A.

Exclusive Canadian Representatives:
Garlock-Walker Machinery Co., Ltd.
32 Front St. West - TORONTO, CANADA

E. H. Shreiner Lumber Company

EXCLUSIVELY WHOLESALE

Band Mill—West Salisbury, Pa.

General Offices—PITTSBURGH, Pa.

11 cars 4/4 Sound Wormy Oak

Band sawed West Va. Stock

SPECIAL

Watch this space each month for Specials.

The Union Box Company

Wooden Box Manufacturers

BALTIMORE, Md., U.S.A.,

Have For Sale

One No. 288 Linderman Jointer

in first-class condition, with extra sets of knives, etc., capable of taking eight foot material.

Also have **three 4-Hole Boring Machines,** such as used for boring holes in diaphragms for AMMUNITION BOXES.

Make us an offer for these machines, or write for further particulars.

A Complete Line of Wood Knobs

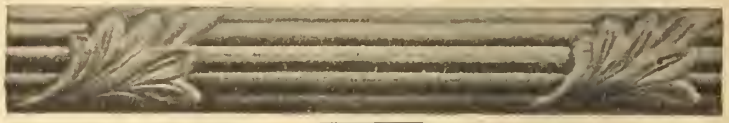
Ask Your Neighbor. He Uses Them.

Period Mouldings in Wood

Did you write for those samples?

Do It Now !

M 74



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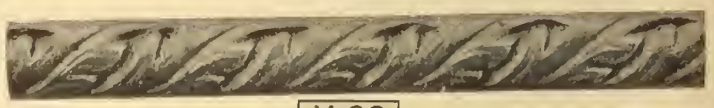
M 90



M 96

M 84

WADDELL MANUFACTURING COMPANY

Coldbrook and Taylor, N. W.

GRAND RAPIDS, MICHIGAN, U.S.A.

Are Your Methods Ancient or Modern?

Greater work capacity with much less effort. Time saving and uniform work are features that should interest you.

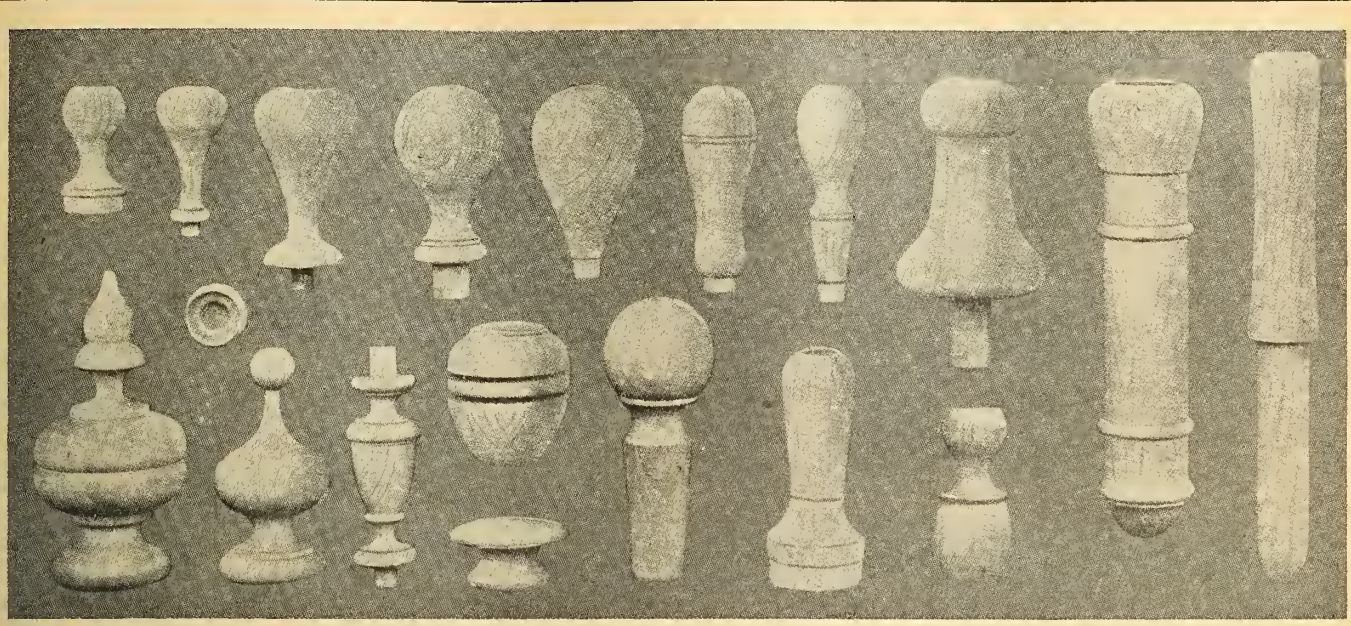
THE WALLACE BENCH-PLANER

operates from electric light socket; weighs only 50 pounds. Length, 18 inches. Knives, 4 inches.

Write for our proposition

J. D. WALLACE & CO.

1402 W. Jackson Blvd. CHICAGO, ILL.



Dowels and Wood Turnings

Those Smooth Dowels

The new dowel machine is a wonder for efficiency. The new process dowel made from it is round. Always round. There is nothing about the manufacturing process which could produce anything but a round dowel.

It is also always uniform in diameter and never varies more than a few thousandths of an inch from the measurements desired. The dowel is finished and polished with a clean cut lengthwise of the grain and not with a scraping cut crosswise of the grain, as in the old method.

These machines are adjustable to any size from 3/16 of an inch to one inch, making these changes as fine as to a 64th of an inch. Our smooth dowels are straight, round and perfect.

Special Shapes

We show above a few of the many shapes which we can turn out with our special automatic machinery.

We are in the centre of the hardwood district and can turn out any shape wanted, in any quantity, perfect and smooth, at short notice. Write us about anything which you may need that can be turned out of wood.

Dowels the Smooth Kind

Birch, Beech and Maple
Plain, per 1000 Pieces

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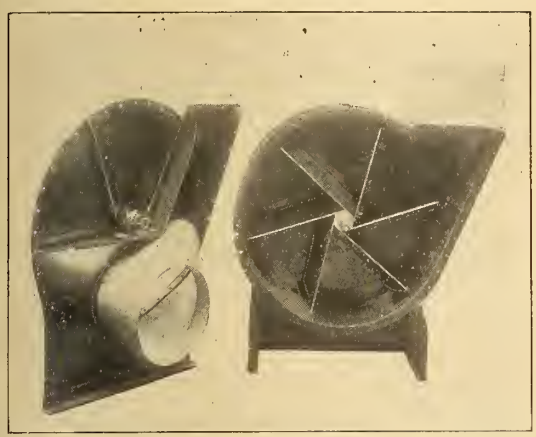

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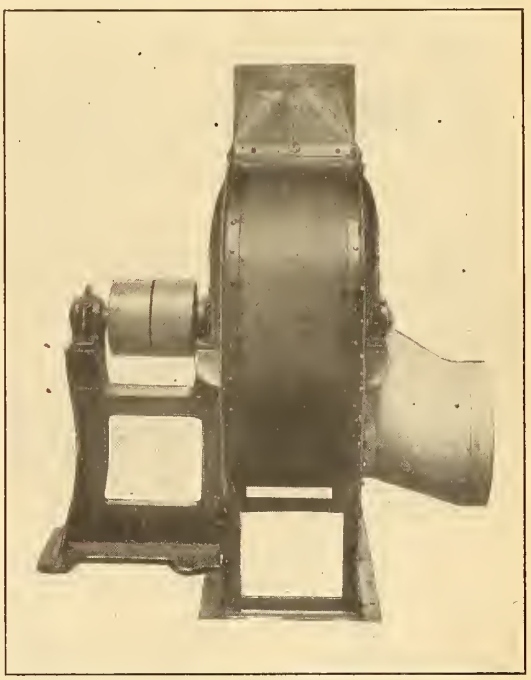

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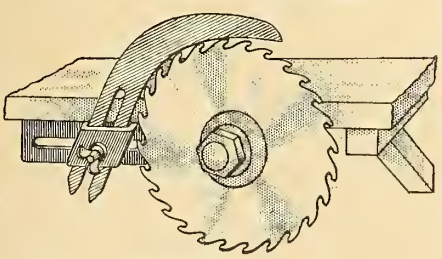

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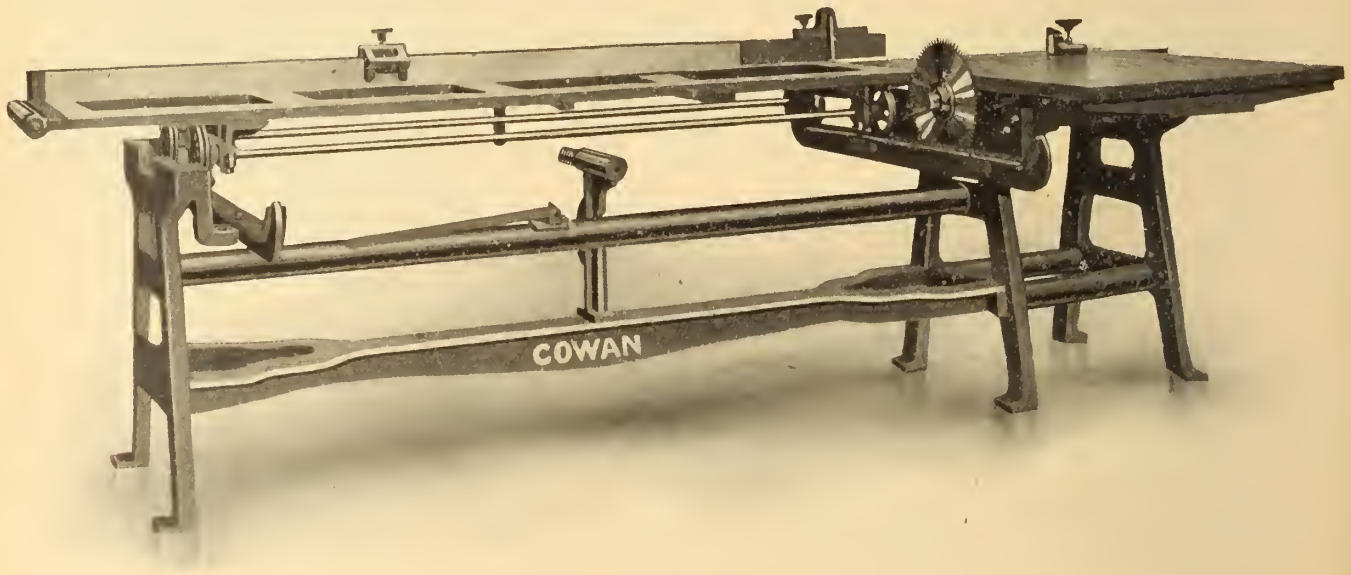

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Profits in the Furniture Business

The aim of the furniture manufacturer is to make and sell his goods at a profit. How to do this is the problem, not of one man alone, but of the entire organization. The buyer takes up the beginning of the problem. He must buy good materials at minimum prices. He has to be the judge of what constitutes good materials, and for that reason should confer regularly with the manufacturing departments.

The superintendent and the buyer should work in close co-operation and both should have all information available regarding materials. Close tab should be kept on purchases to see that the qualities, dimensions, etc., work to good advantage in the product being manufactured.

The designer also has his problems. The goods must be salable, and in order to know what are salable goods he should get an outside viewpoint occasionally. The man that constantly sticks to the designing room becomes stale and soon finds himself lacking in ideas. He should get out around and see the class of goods being sold. Another good plan is to confer regularly with the firm's travellers.

These men are constantly in touch with retailers and consequently know just what goods are selling in the different territories. It is very often impossible to use all the travellers' ideas, owing to their lack of manufacturing knowledge, but they may have good ones from time to time.

The job of the superintendent is perhaps the hardest of all. He must keep closely in touch with the purchasing department, the designer, the selling department and the shipping department, besides being responsible for the quality and cost of the product and the working conditions generally. This is a pretty large order for a man and it must be admitted that the post of superintendent calls for a big man.

The selling organization is responsible for the advertising and selling of the product. To this department falls the duty of directing the travellers so that their energies and talents may be expended to the best advantage. This is the point of contact between the consumer and the manufacturer. Travellers should be induced to make suggestions and criticisms in regard to the firm's line. This information can then be directed to the proper channels; say to the designer and superintendent.

Not the least important part of the organization is the credit department. The work of the Furniture Manufacturers' Association has greatly simplified the work of the credit man. Reports are tabulated which give reliable information regarding the financial status of practically every prospective customer. This information is valuable and of great assistance to the manufacturer in avoiding bad accounts. The work of the credit man then is to keep in touch with the sales department and see that only reliable accounts are taken on.

If these various departments are individually conducted efficiently and they work in harmony with each other, having in view the good of the organization as a whole, it is safe to assume that the maximum profits will be derived from the business.

Special Machinery

During a recent conversation with the head of a woodworking machine agency the talk drifted around to the variety of the lines carried by this particular firm. After a little mental reckoning a figure was suggested as covering approximately the number of kinds of machines carried.

When the writer remarked that they should be able to take care of all inquirers from the lines carried the head of this firm stated that they were not able to take care of anywhere near all inquiries for the reason that so many men want special machines constructed according to their ideas.

It should be apparent to even the most inexperienced buyer that specially constructed machines come very high in price. New patterns must be made for all the parts and it will be readily understood that mechanics will be required to spend a great deal more

time on a special part than they do on standard work.

We believe that in numerous cases the intending purchaser could secure machines to do his work that are already on the market but which he does not know about. It is owing to the fact that he has not seen or heard about certain machines that he starts formulating his own ideas. When he has his ideas fixed in his head he will not consider anything else.

The point of the discussion is, who is responsible for the lack of knowledge concerning existing machines? Is it the man's fault or is it the fault of the makers of the machines for not advertising them?

Manufacturers should advertise their woodworking machines in the trade journals. Managers and superintendents look there for the latest information on machinery and tools and if the information is not there the machine remains practically unknown.

Keeping Machines Like New

There are workmen who, without meaning to, abuse the strength and wearing qualities of their machines. Their aim should be to use this strength, not to see how much it will stand, but to make it last and work profitably. Very few men purposely neglect their machines, but it is the very small neglects that do a lot of damage.

If a man omits to clean his machine for a couple of nights a larger trouble than the want of cleaning will develop. Dirt, grease and sawdust will fill up oil holes, or work into the bearings, and other working parts, and cause serious troubles. Cleaning machines every night will overcome this difficulty. When properly taken care of machinery will only have to be disposed of when it becomes obsolete; not because it has worn out.

The old saying about "a stitch in time" cannot be applied more appropriately than to a machine. When wear in a machine becomes noticeable it increases many times as fast as it did before the trouble became apparent. When you can shake a drum or cutterhead just the least little bit at one end then is the time to tighten up the journal to a correct fit.

The majority of workmen are careful not to wear themselves out unnecessarily, but some of them forget that it might be profitable to apply the same treatment to their machines. The corners are often worn off nuts by using too large a wrench, leaving them round and difficult to turn, when a little search would produce a wrench of the correct size.

It is safe to say that the time age of a machine generally reflects upon the methods of taking care of it. A good idea of its age can be obtained from its appearance. Age marks will undoubtedly appear and paint wear off in time, but the life of a machine can be considerably lengthened when care is taken of it.

If shafts are the least bit out of line, both machine and belts will soon show signs of trouble. Unnecessary wear of belts is a big expense. Line up the shafts and machines and overcome this expense. It is a bad policy to nail up boards to keep belts from running off the pulleys.

By keeping your machines clean and looking like new they will run like new.

Canadian National Exhibition

Shortly after this issue of the "Canadian Woodworker" is off the press this big annual exhibition will be in full swing. Visiting furniture manufacturers and woodworkers will undoubtedly find something there to interest them. Machinery Hall is one of the buildings they should visit. The woodworking machinery firms will no doubt have their latest and most up-to-date machines in operation.

We know of at least one machinery firm that has been working for some time on something special for this exhibition. We are not at liberty to give out the details at this writing, but we believe that owners of woodworking plants, their superintendents, foremen and workmen, will not be wasting their time when visiting the machinery exhibits, and we can safely say that they will receive every courtesy and attention from those in charge of the exhibits.

Popularizing Oak

The publicity campaign recently launched by the American Oak Manufacturers' Association is believed by them to be the most extensive campaign ever undertaken in an effort to popularize any wood.

Oak has always held a prominent place in the public mind as a furniture and interior finish wood, but, strange as it may seem, oak furniture has never been featured very prominently at furniture expositions, manufacturers using mahogany and walnut furniture largely to make up their displays. Therefore, it seems to be the furniture manufacturers who need the encouragement to make oak furniture popular.

Oak has always been popular with the general public, so that the cold shoulder which has been given to oak for some time has no doubt been due to the exploitation of other furniture woods and the tendency of the manufacturers to take up something new. We believe, therefore, that if the oak manufacturers concentrate on furniture manufacturers and retailers and point out to them the value of pushing oak furniture the public will fall in line without a great deal of persuasion, because they know that oak furniture is one of the most serviceable kinds they can purchase.

The man who drives a bargain doesn't have any great respect for the man he drives it with, unless he finds out afterward that his "bargain" was an illusion.

Good tools and good material will never be found to stand in the way of good work.

Placing Machines to Avoid Vibration

Arguments Why Machine Room Should be Located on Ground Floor—Solid Foundation Adds to Efficiency—Concrete Bases Recommended

By James Clark

The greatest enemy to the proper working of any machinery is vibration. It not only affects the quality and quantity of work, but is a source of danger as well. The placing of machinery in a factory building impels the consideration of, first, the flow of material as it proceeds from one operation to the next, in the most direct manner; second, the stability of the floors and the building itself to withstand the vibrations and strains that are bound to occur in the operating of high speed machinery.

The nearer you can place your machinery to Mother Earth, the better for the welfare of all concerned. Consequently the ground floor of the factory is the logical place for the machine room, regardless of whether the power is steam, electric group, or individual motor drive. The writer has, during his experience, helped to remedy a great many vibrating floors and buildings. Some of these were caused by the faulty and hurried installation of machinery and the corrections necessary after added a great deal to the expense.

Generally speaking, well made machinery with all parts nicely balanced, will run well on a heavy, well joisted ground floor with little or no shake to the floor. The one big advantage in having a really good floor in a machine room is that the machinery can be shifted if necessary without the running qualities being interfered with, as far as the floor is concerned. At the same time, there is nothing like good concrete foundations for all the machines, and for the heavy machines they should be bedded well down into the earth.

Some examples from experience include one of a big band re-saw that stood on the ground floor of a factory. As the floor had to be cut through to accommodate the lower wheel of the machine, and the dust pipe, etc., it was somewhat weakened, and that machine rocked while in operation more than was good to see. That state of things went on for several years, but as some repairs were being made to the factory, the opportunity was seized to put a concrete foundation under the re-saw. It was pulled out of its "hole," a template taken of the base for the bolt holes, and a cement pier was built in, having good substantial bolts embedded (the same as would be done in putting in a steam engine). When the "bed" was hard enough the re-saw was moved on and bolted, and ran like a charm ever after.

To move such a machine to another location would be a serious matter but as a re-saw in a furniture factory is among the casual machines, it is generally placed so that it is likely to remain unaffected by changes of equipment.

The small and insignificant looking spindle carving machine, that runs at such a high rate of speed, will very often develop considerable vibration trouble. This can be overcome by placing it on a concrete bracket bolted through the wall, the bracket having bolts embedded for the holding of the machine. The method is to bore holes through the factory wall to receive good sized bolts, having the heads inward. A hollow wooden pattern of a bracket form is held against the wall; the heads of the bolts are secured and the pattern filled with concrete, the base bolts for holding the machine are placed in the soft concrete according to template. When the concrete is dry the wooden shell is stripped off and you have a most substantial cement bracket on which your machine has a good solid base. A feature of this bracket is that it does not take up any floor space. In bolting a carving machine to a cement base it will be found advisable to use leather washers between the iron and cement. After the cement bracket has hardened the nuts of the bolts can be tightened from tthe outside. Another method is to have a cement column running through the floor into the ground. This is alright, but is much more in the way than the former.

A multiple boring machine, the counter driving shaft of which was directly over head, "danced around" like a man with the ague. The parts of the machine were tested as to balance and found alright. The floor and joisting were not as new and strong as they once were and could not withstand the strain of the perpendicular drive belt, so it was next to impossible to work at the machine. This was remedied by ripping out a section of the floor, putting down a stone foundation and pouring cement into it, embedding a couple of dovetailed pieces of wood and flushing the bed with the factory floor. When dry, the multiple machine was bolted on and ran as steady as a clock.

Having had many parallel experiences the writer has come to the conclusion that there is nothing like cement for machine foundations, and if the position of a machine is reasonably certain for a time would put such a foundation under it. There is a "sweetness" to the running of such a machine that can be accomplished in no other way. Trouble can frequently be traced to the inequalities of the belting. In a fast running belt poorly made lumpy splices which make heavy spots will soon create mischief both in the shake, and wear and tear.

The hanging of counter shafts under the ceiling is another pet source of complaint from the men who have to work over them, and if you want to know what a real tired feeling is like, work all day on a trembling floor. The bolting of hanging countershafts directly through the floor is a mistake. In the first place you mutilate the floor and have to countersink the bolt heads, or leave them sticking up as a source of "pleasure." Then again, the chances for the floor shaking are really good, if the work is done in that way.

The countershaft should be suspended from strong sturdy pieces, the ends of which rest in recesses in the top edge of pieces that are bolted to the joists of the ceiling. (We are speaking of a mill construction building that may be from seven to ten feet from centre to centre of joists). The pieces that sustain the weight of the countershaft are kept from touching the floor above, and are quite independent of it. If the countershaft has a centre hanger (and there is bound to be a sag of the supporting pieces in time) stiffen with a truss rod and upright. This will take care of any

tendency to droop. By installing the countershafts this way you avoid mutilating the floors and all work is done below the ceiling. The countershaft can be easily moved and placed elsewhere with the minimum of labor.

It requires so little to throw a cutter head or high speed shaft out of balance and make things "jump around" that it is surprising when you really find out how small a weight will do it. One day a man was running a lathe that was used for roughing off and partly forming large turnings. The machine is equipped with murderous looking knives that have a shearing cut, and although this man had spent the largest part of a day in setting up the machine his heads were so much out of balance that the big heavy machine trembled like a leaf. When the trouble was really adjusted the actual weight involved was less than four ounces, but travelling at a high speed that four ounces was multiplied so many times that things would have happened if the multiplication had gone on.

The cause of vibration is inequality of weight. If the running parts of a machine are in perfect balance and alignment, the tool in itself is perfect, and if power can be applied to it without the strain and pull of a belt it will run perfectly and smoothly. A steam engine is a finely made machine with all parts carefully balanced and if it was a driven instead of a driving machine, it would not need a foundation sunk into the earth, sometimes as much as eight or ten feet deep. Being a driving force, however, it has to be anchored safely, or we would soon have a smashed-up engine to deal with.

The example of the installation of a steam engine, with all the care and thoroughness is equally true of all machinery installations, having due regard for the requirements and purposes of the equipment.

Practical Discussion on Feeding the Moulder

Fourth Article of a Series — Does It Pay to Use Unskilled Labor? — Defects to Watch for When Running Various Woods—Knives for Curly Grained Stock

By S. E. Saunders

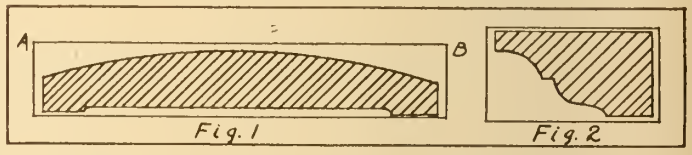
How often have woodworkers of advanced and long experience heard it said, "Anybody can run a sticker after it is set up for him."? While it may be economical to use cheap help in feeding a moulder—for planing mill work, furniture work, or any class of work where stock mouldings and long runs are made, depending, of course, on the grade of lumber used and the quality of the moulding turned out, it is certainly wasteful to use inexperienced help on odd details and expensive woods.

For many kinds of planing mill work, such as flooring or shiplap, etc., the lumber is graded before it reaches the machine and is often marked for face side. In this case the operator feeds his machine as the lumber is marked. But when it comes to getting first class mouldings out of stock containing defects, when by running the stock in a certain way the shape of the moulding will hide the defects, it follows that if an error is made in feeding the piece of stock will be wasted.

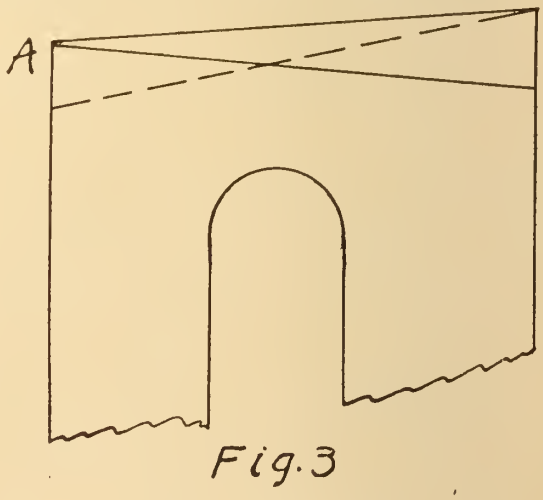
One who has had little or no experience at feeding a sticker may think that he can pick up a piece of lumber and see at a glance just how to put it through so that it will show up to best advantage. A simple illustration here may explain a point the writer has in mind. As mentioned before the material is sometimes marked for face. In this case the yard foreman had marked a quantity of stock for a flat oval moulding as in Fig. 1. The reader will see that much care should be taken in marking, as at A and B bark or wormy edges would cut away, also sun checks or other flaws on under side. If properly stuck a good piece of moulding would be produced.

Again when lumber is free from defects or blemishes of every kind it is often so cross grained and curly as to require a high grade of skill to run it without tearing up the finished surface. But the operator should not be discouraged, for unless there is a looseness in the grain, which is a defect, any wood may be moulded without chipping deep enough to spoil the pattern.

With woods like white pine, basswood or poplar, little attention need be given the grain, while a sharp lookout must be kept for knots, sap shakes, or rot. For woods having a more pronounced grain it is necessary to turn the stock so as to cut with the grain as much as possible, and this will depend largely upon the pattern of the moulding. It is a common error for feeders to always feed with the grain slanting back toward the top, no matter what the cut may be. This is alright for a balanced moulding like the casing in Fig. 1, but in



Mouldings that can be made from defective material if properly run.



Knife for working curly woods.

the case of a rabbet or a lopsided cut like that shown in Fig. 2 the feeder should look at the top of his piece for grain instead of the edge, because the vertical cuts are liable to tear out at the inner edges if worked against the grain, and the thin edge might also be injured by the side knives. However, it is sometimes

necessary to feed directly against the grain, on account of certain defects in the lumber which must be kept out of sight, and the only way to reverse the grain when looked at from the top is to turn up the other side of the board. To get the other slant when looking at the edge the board must be turned end for end.

The fact should be kept in mind that the deeper cuts do not tear out so badly as the shallow ones on the same run. This may be explained by saying that the chipping occurs near the surface, and is cut away as the piece is fed along. As it is necessary to set the chip breaker back on account of the long knives, the desired protection is not afforded for the light cut.

A simple method of working surfacing knives against the grain is to turn them over with the beveled side against the grain. This may be done without disarranging the cutting line if they are set back on the head a distance equal to their own thickness. As this generally brings the edge of the knives about even with the adjacent side of the head it leaves a little V-shaped pocket at the bevel of the knife which a fast feed and a heavy cut will clog up, but it is seldom that a fast feed is used where the reversed cutter is necessary. There is another method the writer has used when confronted by the worst-grained curly birch.

The knives for this work should be made of solid steel, the cutting edge should extend diagonally across the end of the blank, a bevel being ground on each side from nothing to about 5/8 of an inch. Fig. 3 will give an idea of the cutter. The dotted line showing the bevel on the side next to the head should be as much shorter at A as its thickness, so that it will cut level when put on the head straight. If the knife is the same thickness as the projection for the cutting line these knives may be set up by placing the long side even with the cutting line on scale and the short side flush with the head.

It is seldom necessary to reverse the pattern knives in order to save the moulding, but it may be done with profit occasionally.

So far I have considered the condition of the wood to be moulded, without regard to its appearance, but now we will discuss the stock to be run for a fine finish in oil, wax, or varnish. The commonest of these are oak, Georgia pine, cypress, ash, walnut, birch, cherry and mahogany. It now appears to the feeder that in addition to keeping track of the grain and dodging the various defects he must always select the best markings or figure for the face side.

In feeding oak it may be important for the operator to know the finish, for with a certain finish a dark streak will not show and will thus permit and save the best figured side for face.

When feeding quartered oak for a pattern similar to Fig. 2, it stands to reason that the nature of the cut would destroy the figure as shown on the surface. However, it seldom happens, especially in thick stock, that the grain runs straight down through the cut It usually slants off more or less to one side and if the stick is fed so that the grain will be as nearly as possible at right angles with the cut the medullary rays will show up on the face.

The writer has often secured handsome quartered effects from plain oak by running it in this way with careful feeding. The feed of a moulder may vary in speed from 25 to 200 feet a minute, depending entirely on the stock being run in one case, and the build and solidity of the machine in the other. A great deal is said nowadays about fast feed matchers, but the writer has still to be shown where it pays to run mouldings at a high rate of speed and spend more time sanding than would pay for the extra labor and time required to feed slower and "cut" your moulds.

Promising the apprentice that he will discover many things in feeding a moulder that are not mentioned here in this paper, I will assure him that if he will heed what he reads and is not too lazy to turn every board that needs it, he will in due time obtain satisfactory results.

Manufacturing Hardwood Flooring

By Manager

Manufacturing hardwood flooring appears on the surface to be one of the easy jobs, but I can assure you that anyone starting in to manufacture a high grade hardwood flooring will not have a bed of roses to repose on. To manufacture high grade maple, birch or oak flooring demands the very best equipment that money can buy, with the buildings located in such a way as to enable the raw material to reach the machines at the lowest possible cost.

A very important matter in the manufacture of this kind of flooring is the dry kilns, as the trade demands that the lumber to be manufactured into flooring must be dried, and dried in such a way that the life of the material is not destroyed in the process.

The dry kiln being of such a nature as to assure the lumber coming into the factory O.K., one of the great obstacles in the manufacture of hardwood flooring is overcome. Personally, the writer prefers the natural draft kilns where the lumber enters the kiln in a moist heat and gradually passes to a higher temperature until it leaves the kilns with only from five to seven per cent. of moisture left. After leaving the kiln it should remain for twenty-four hours or so in a cooling shed; then it is ready for the machines.

The lumber is run into the factory on the same kiln cars and unloaded at the rip saws, where it is ripped into the different widths. To overcome the waste the best machine for ripping is a gang saw with a number of saws spaced at different widths to make the various widths of flooring that the builders and dealers require. By ripping on a gang saw the lumber is made straight and you get away from the kinks in the lumber that will show up if ripped on a single saw, as the saw follows the shape of the edge very largely.

The matching is the next process, and on this depends very largely the quality of the flooring produced. The writer thinks the best method is to surface all your lumber before it goes to the matcher. Between the surfacer and matcher a saw should be placed to enable the rough spots and broken ends to be trimmed off. The lumber being dressed the operator at the matcher can throw same on the feeding table right side up, and the machine will take care of the matching. It is quite essential that the matching be watched very closely and for this reason a man should be placed at the out feeding end of matcher to see that the matching and machine work is always kept in first class shape, and to watch for broken pieces getting under the lumber at the matching heads, thus throwing out the matching. He should also watch that the knives are jointed and changed as often as is necessary. There is nothing gained by running the knives too long.

Some of the latest types of hardwood matchers

have a polishing device inserted so that as the lumber passes through the machine, a very fine shaving is scraped from the surface before it reaches the side heads. By this process your matching is always the same. Another way is to pass the flooring from the matcher through a polisher or scraper and then it goes by conveyor to the end matchers. The latest kind of end matchers trims and end matches at the same time, and are quite a saving in labor. From the end matchers it is conveyed by belt carriers to a grading table where it is graded into the different grades, and then passes to the tiers who tie the flooring in bundles and mark the grade and feet contained in each bundle.

The best kind of a building for a flooring plant is one with a basement so that all your drives and exhaust pipes are placed below the floor and the conveyor that takes care of the cuttings can be much better installed if a basement is provided.

Buildings where hardwood flooring is to be manufactured must be substantial and all heavy machines must be on cement foundations. As about one-half of the lumber cut up goes into refuse it is quite necessary that plans be made to take care of the refuse. If electric power is used, generated by water, then from the refuse some by-product should be considered, such as wood alcohol; and perhaps charcoal might be made, or gas for lighting and heating purposes.

To manufacture this kind of material you must have lots of stick-to-itiveness, and don't ever think it is an easy way to get rich quick.

Equipment for a Wood Turning Department

Factory Man's Viewpoint—Says Days of Hand-Turners Are Not Over, and Discusses Interesting Points on Operating of Automatic Turning Machines

By W J. Beattie

The turning lathe was one of the very first machines to be used for fashioning wood into forms of more or less pleasing appearance. Long before the application of steam or water-power, the lathe, in a more or less crude form, was being used for turning purposes, the power being supplied by the turner himself or by an assistant.

The turning lathe equipment of the modern furniture factory is a more serious thing than it was even two years ago, speaking from the investment point of view. We still have to begin with the hand-lathe and the essential hand-turner. With these alone it is quite possible to do any and every kind of real turning, leaving the rest of the big investment to be made by those firms who can keep their plants running at sufficient capacity to pay for the outlay. There is more idle machinery in woodworking plants at the present time than at any previous time in the history of the business, and many of them are turning machines.

This statement is not an argument against buying semi-automatic turning machinery, but the fact is that the capacity of a "Mattison" or "Yates" lathe is so great that, unless the factory has a very large output of goods calling for turned parts, the machine will be idle a considerable part of the time, though it may be a good investment at that. The way to keep one of these machines working to as nearly its capacity as possible is for several factories to send their requirements to the one plant. This is nearly always a practical solution, and is of mutual help. The quality of the work turned out by the machine is better than from a tool that is only used occasionally, as it is natural to assume that the operator becomes more expert wth practice and experience.

You have no doubt gazed in admiration at the examples of turned work—round, square, octagonal, etc. —that the manufacturers of these machines send to you to show what the machine will do, and which are a strong inducement to put up the price and possess the machine. There is not the slightest doubt of the honesty of the machinery manufacturer; the work sent was done on the type of machine that he manufactures, but how many of the ordinary machine men, who are supposed to be able to run one of these lathes as well as the real expert employed by the machine manufacturer, ever equal the work of the samples sent by the manufacturer of the lathe?

The high grade of work needed for present-day requirements means that the men who look after the small details in the setting up and running of these machine tools must exercise great care and attention. In the writer's opinion, there has been a lot of harm done by manufacturers who continually harp on the assertion that "any kind of a dub" can turn out the work on such-and-such a machine as well as a man of skill and judgement, and at a big saving in time, especially wages. As a great many manufacturers can only see what is right in front of their noses, the difference between 20 cents per hour and from 30 to 40 cents is such a strong argument that they fall for it about every time. They will put about seven or eight hundred dollars into a machine, put on a "good, cheap" man to run it, and imagine they are executing a real stroke of genius. Afterwards they marvel that the machine does not live up to its advance notices in the quality of the work.

Another feature detrimental to the furniture manufacturer is the oft-repeated and advertised assertions that the days of the hand-turner are over and that he is already a fit subject for the industrial undertaker. One very striking announcement depicts a fine-looking, elderly man, a hand-turner, who has been, or is being, dispensed with. He is supposedly being so much replaced by a machine that his services are no longer required; and, though he may have been a faithful employee for several decades, out he goes, neck and crop, leaving the impression that any time spent on a wood-turning hand-lathe would be wasted.

There is the greatest possible need for good hand-turners this very minute, and there are some factories right up against it, not knowing where to get a hand-turner from. No matter how many machine lathes are used, the pattern has to be hand-turned, though it is possible to set up without a turned pattern, working from a drawing, on which the style or number of knives to be used is indicated. This is not nearly so quick or accurate as using the hand-turned original and setting the knives to it, as the chance for the mis-

takes of the "dub" previously mentioned would be multiplied.

The work as turned out of a semi-automatic lathe by the average machine man is not remarkable for finish or execution, and if the parts are for an article that is above the common type, they have to be put in a hand-lathe and "trimmed up," as there are many parts that break off in the machine lathe, caused by the dulling of the knives, impatience of the operator, pressure for a big production, or the quality, or lack of it, of the material being used. No machine lathe will give the beautiful finish to a turning that an expert hand-turner can give, and as long as high-grade work is required, it will be impossible to dispense with the services of a hand-turner in a furniture factory that has any kind of pride in the goods it turns out.

The most effective equipment for the wood-turning department of the furniture factory is, first, a man, a good hand-turner; second, the hand lathe; third, a "Mattison" or "Yates" lathe. Make or induce your hand-turner to take charge of all the turning, the setting up of the machine lathe and the care of the knives. Give him, as an assistant, a good, smart youth of 16 or 17 years of age, who can take his turn running the machine lathe, and also begin on simple hand-turned work, of which there always will be small quantities to do. Before many months are over you will have a young turner coming along who will be a dual purpose man; hand or machine will be all the same to him.

If more of our manufacturers looked ahead and thought as much of men as they do of machines, they would not be wailing over the ways and means to get their hand-turning done.

To the afore-mentioned equipment it may be advisable to add a twist machine. While not necessarily a hand-turner's work, it is an easy matter for him to oversee that also. The twisted Jacobean turnings are not so much in evidence at present, but the machine can be used for other purposes if necessary.

The Modern Surfacer and Its Operation

Describing Some of Its Features and How They Can Be Utilized to the Best Advantage—Suggestions on Grinding and Jointing

By F. E. Tracy

Although not as much featured, progress in the surfacer line has quite kept pace with the improvements in moulders, matchers, and other highly developed tools. To begin with, surfacers are made in a wide range of sizes, to operate on an equally wide range of stocks at various speeds. One manufacturer, for instance builds eight different types of surfacers—different in purpose, size, construction, capacity, finish, and equipment. The smallest machine will handle short furniture and chair parts; the largest machine will surface great blocks fit for the sizer.

Development has come so fast in surfacers that no construction has become standard—not even to any considerable degree with any one manufacturer. Some concerns continue to employ gear drive, others prefer the automobile chain—especially on the larger types, as the roller-bearing chain will stand up to high speeds and give several times the required power without vibration or noise. The automatic feeding table is usually additional equipment, but, if specified, can be had to hopper-feed frail short stock or automatically feed long stock of all lengths and widths. Besides giving far greater capacity with less physical work to the operator, the automatic feeding table allows time for the selection of the best side of the boards.

Sprung arbors or broken castings as a result of choked down cylinder heads are now overcome by employing gravity tighteners on the slack side of belts. These enable belts to transmit double their old power with less wear because of more perfect contact to pulley surfaces. Thin cutters, round cylinders, grinding and jointing devices are the same as on high-speed matchers. This equipment not only saves a great deal of time and enables fast feeds, but eliminates chipping out around cross-grained or knotty places. Sometimes operators, in their effort to lose as little time as possible, unintentionally slight both grinding and jointing. A few extra minutes spent in the jointing will save dollars in the manufactured stock. Each knife must be brought to the cutting circle and do its share of the work. Surfacer knives are long and consequently may come from the filing room with a bow in them. This will show up if the knife does not fit the setting gauge when placed at the centre of the cylinder. The length of these cutters make it necessary to grind them in the cylinders on special grinders designed for these machines. If knives are only set and jointed in the machine one knife will often be cut too far at some point so that it will do more than its share of the cutting and develop a heavy head which will mark the stock at every revolution. Once the cutters are correctly ground, they can be jointed a number of times before re-grinding is necessary. Where the knives are not cutting evenly the operator has to drop his feed to make the unevenness of the cut less noticeable, but the slower feed proportionately lessens production. Joint lightly with the head revolving at top speed. A heavy jointing forms a flat heel which will blister stock and raise the grain.

The surfacer is such a handy machine that a number of men will use it for odd jobs. This keeps the machine in poor adjustment and it is left that way as long as stock will feed. Consequently the surfacer often gains a reputation for poor work, especially as to breaking off knotty cross-grained places at the point where the grain runs down from a knot. Where the operator has to jump on the pressure weights or pull at stock to get it through the fault is seldom the machine's, but is due to warped pieces which cause uneven pressure.

If the lock nuts are not set tight under the feed roll boxes the vibration will loosen them so that they may cause the bolts to work around and let down the rolls. For fine work the in-feed roll should come about 1-32 inch above the bed; for rough stock 2-32 inch is enough, and for slippery or snowy lumber 3-32 inch is right. The chip-breaker should be lined up with the cutting circle of the knives, with the point only resting on the stock. Avoid a heavy heel as it causes so much friction that the end of stock is liable to stick. A shallow

heel eliminates the necessity of continually lifting the chip-breaker.

Every time the knives are ground and jointed they are raised a fraction higher. At such times the bar-after-cut should be adjusted again so as to be in a direct line with the cutters. The bar-after-cut may be adjusted by running stock at each end of the bed. If one side of the bar is too low the board will twist around toward the other side. If too large, wavy lines or snipping will result. Avoid using the center of your machine more than the sides. Use every part the same and wear and adjustment will remain even.

The top out-feed pressure roll should be set a trifle below stock but not enough to cause a thud as stock leaves the machine. Set your guides at a little angle to the cutter head for feeding stock on edge. This crowds stock over so that it can't turn over, and permits of feeding a number of pieces together. The modern surfacer is a highly developed tool and will produce the best of work at all times when given proper care, so don't blame the machine if results are poor, but determine the cause, and you can easily find the remedy.

Teeth for Rip and Crosscut Saws

By J. C.

One of the first and most essential tools for operating on wood is a saw. In well equipped woodworking shops machine saws, either of the band or circular type, do nearly all the sawing, and only a trifle is done by hand.

Saws vary in size and shape of teeth according to the kind of work for which they are intended. The teeth angles vary according to whether they are intended for crosscutting or ripping, or for hard or soft wood. Saws for ripping have more hook or forward rake than those for crosscutting.

The amount of set or swage varies for the same reason. The ordinary speed of a circular saw is ten thousand feet rim motion per minute, but small circular saws up to 12 inches in diameter can be run safely up to twelve thousand feet rim speed per minute. To insure safety in running any saw no lumps or twists should be visible when the surface of the blade is tried by a straight edge.

In fitting small circular saws, either crosscut or

Fig. 1

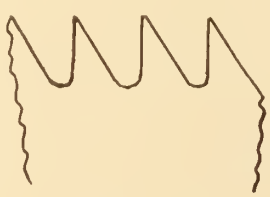


Fig. 2

Fig. 1—Teeth for fine cut-off saws. Fig. 2—Showing teeth with pitch in centre.

rip, it is necessary that they be kept perfectly round. The teeth should be of uniform depth and spacing. This can be obtained by using an automatic saw sharpener, using an abrasive wheel which will make the gullets round. This will avoid cracks which are frequently caused by using a file as this leaves a square corner at the base of the teeth. If filed by hand the saw will clear better if the bevel is carried only half way down the depth of the tooth.

The set of a saw is determined by the kind and condition of the wood to be cut. For green soft wood the maximum amount of set is required, which should be only sufficient to keep the blade from becoming warm when cutting. Saws used for cutting very smooth are not set but are made with a clearance extending from the rim to the centre, varying from three to four gauges.

There are a number of ways of imparting set to the teeth of a saw, but the best known method is

Fig. 3

Teeth for cross-cutting and mitreing.

that of the hammer and setting block bevelled on four edges with the saw placed on the bevel best adapted for the use required.

Rip saws are sometimes swaged and compressed to a suitable thickness at the point to give the proper clearance instead of being set. If a saw persistently runs to one side so that it does not follow a straight line it will generally be found to be due to a defect in the saw itself; either the blade is not true or the teeth have more set or are longer on one side than the other.

In case the saw has not enough tension it will run "snaky." This defect can be corrected with a hammer. Saws without uniform tension will also run snakey, as there are slack and tight places in the blade which require skilful treatment with the hammer.

The principal is that slack places can be tightened and tight places slackened by hammering, which spreads the metal in those parts, at the same time making the slack places uniform in tension with those that were tight.

Unequal tension is also the cause of cracks as the centrifugal motion of the saw causes the rim to expand and tight places are sure to develop a crack.

Fine tooth cutoff saws, if used where smooth work is desired, require no hook to the teeth and should be made as shown in Fig. 1. Saws with the pitch to the centre of the teeth, as in Fig. 2, cut more rapidly but not so smoothly.

A tooth found to work very satisfactorily in soft and hardwood for both cross cut and mitering is made as shown in Fig. 3, and can be run with the bevel edge toward the operator for crosscutting and vice versa for mitering.

Teeth on Mortising Chisel

Any one who has operated a mortising machine, and spent more time in cleaning the mortises with a carpenter's chisel than was required to machine them, will appreciate a little stunt that is used in a Pennsylvania shop.

The idea is to file several teeth in the back of the chisel, extending from the point about 1½ in. up the back, the teeth to be made as large as possible without weakening the chisel. These teeth prevent the cuttings from packing in so closely, and also will remove all that they come in contact with.—Charles West, in "The Woodworker" (Indianapolis).

The Equipment of the Filing Room

By J. K. Chalmers

It has been said that the filing room is the heart of the factory or woodworking plant. Yet there are woodworking plants, equipped with the most modern machinery for the manufacture of the lumber into the finished product, where the filing room is utterly disregarded and the filers allowed to care for the saws by hand. The perfect fitting of the saws is a necessary adjunct to the steady hum of the machinery. Band-saws should be properly swaged and brazed and have uniform teeth, both as to size and depth of gullet, in order that each tooth will do its proportionate share of work and cut smoothly.

Many filers in furniture factories and box manufacturing plants are doing good work, but just as many differ as to the proper tension to carry in their saw and the pitch of the teeth, and they have their own ideas as to whether a crown back band-saw will cut straighter and cut more lumber than a straight-back saw. All are agreed, however, that it is a self-evident truth that the best results from saws are contingent upon fine tensioning, swaging, side-dressing, and sharpening, results obtainable only from the use of modern saw-sharpening and fitting tools.

This leads up to what constitutes the equipment of an up-to-date filing room. Filing rooms are variously located; and, while it is a very important part of the plant, is often relegated to a part of the factory having poor light. The filing room should have good light, with north windows preferably, and should be free from excessive vibration.

What is a proper filing equipment? That depends on the number and kind of saws used. If band-resaws are being used, even occasionally, there should be a sharpener, fully automatic in its operation. This machine will keep your saw uniform in width, and teeth of uniform pitch and shape will result. No other operation by hand is necessary if the machine is properly adjusted. Care should be taken not to grind too hard, as case-hardened gullets or burned tooth points may result. The machinery should be equipped with back feed and post brackets, as this method of feed ensures more uniformity.

The shapes of the teeth vary according to the ideas of the filer, but a saw having a tooth shaped as shown in Fig. 1, and about 3/8 inches deep, has been found to give better results than a round gulleted tooth (see Fig. 2), as it gives more room for sawdust and is not so liable to crack.

The saw can be tensioned with a hammer, but that method is not an economical way to give a saw one of its most important treatments. A saw will, with proper handling, distribute the tension more evenly than any other method, and do it much more quickly, as the pressure of the rolls is uniform on both sides of the saw. New saws require special attention after the first two or three runs, because of "surplus elasticity," which must be taken up and distributed through the blade.

Tension is sometimes called surplus steel, and is obtained by stretching the centre of the band-saw its entire length uniformly, which puts more strain on the edges of the saw than on the centre when in operation.

In addition to the above-mentioned machines for band-saws filing tools are required. A swage, a swage shaper, a filing clamp, a brazing table, and lap-grinder are the prime requisites. One important tool, and one which must be kept in good order, is the swage. The die must be kept smooth and the anvils kept square, or else one corner of the tooth will draw out more than the other in the operation of swaging. The swage shaper gives the proper clearance of the swage, and if the dies are properly adjusted, will give a uniform clearance on both sides of the tooth. The brazing table and lap-grinder are two parts of the equipment which it is not necessary to use very frequently where a skilled mechanic has charge of the filing.

As for circular saws, there are a great variety of them, and they require the work of a skilful filer to

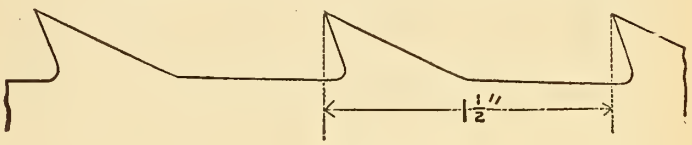


Fig. 1

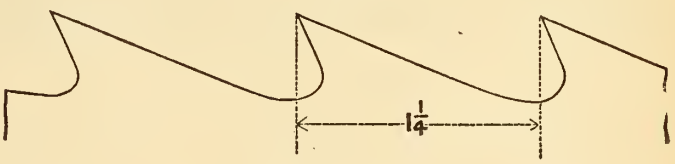


Fig. 2

Teeth shaped like Fig 1 leave more room for sawdust than those shown at Fig. 2.

make them do the work that is expected of them. Automatic machinery is now made which will sharpen either rip or cross-cut saws, grinding any desired bevel and making the saws more uniform in the shape of the teeth. Circular saws do not require as much attention as to hammering and tensioning as band-resaws.

Getting There First

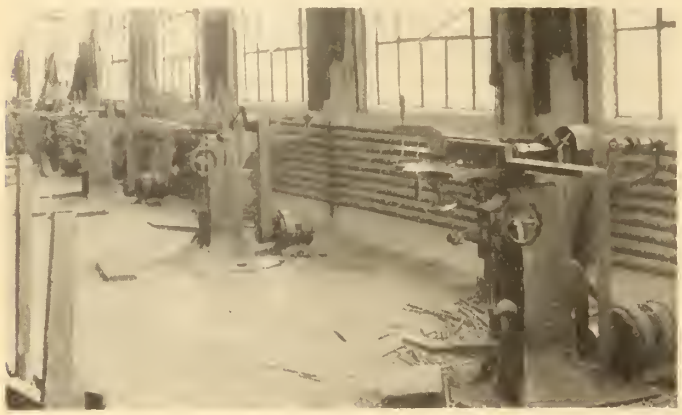
Manufacturers who are in a position to anticipate their wants would do well to emulate the example of certain far-seeing concerns which are laying in heavy stocks of lumber and veneers. The immediate necessity is the probability of rolling stock being tied up during the crop-moving period just ahead; rather, substitute the certainty of that happening. This is a time when food looms as the most important thing in existence, and it will certainly be given the right of way. The only sure method of having all the material needed for full-time factory operation is to get it in ahead of the rush.

In this connection it is also worthy of note that veneer concerns with warehouses in consuming centers are arranging for heavy stocks to be carried there, when shipping conditions at the mills permit. These warehouse stocks, located close to consuming factories, are likely to be an anchor to windward, and will enable concerns thus fortunately situated to take care of their customers under conditions that would prove trying otherwise.—Hardwood Record.

Motor Equipment of Woodworking Plants

Some of the Advantages Claimed at This Factory are Increased Production, Saving of Power, and Improvement in Quality of Machine Work

The woodworking plant described in this article consists of two five-storey buildings, one of which has only recently been erected and put in operation. Originally the older of the two buildings was steam-driven, but about a year ago several machines in this building were changed over to individual motor drive. The results proved so satisfactory that when the new building was erected it was decided to equip it throughout with individual motor-driven machines. Additional machines in the older building were also changed over to individual drive, until now the engine in that building drives only about one-half of the machinery installed there. It is the intention of the company to gradually change over all machines in the older building to individual motor drive. The plant, as now equipped, is considered to be one of the cleanest, most efficient, and best-lighted woodworking plants in the country. In both buildings Westinghouse induction motors of the wound rotor and squirrel-cage type are used.

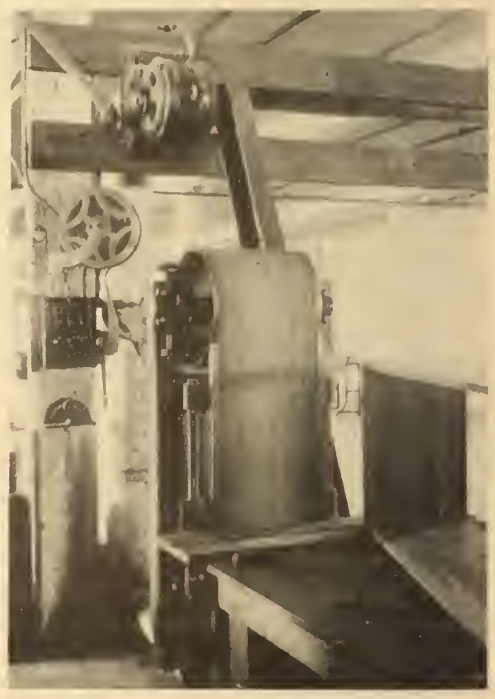


Battery of motor driven boring machines.

The articles manufactured at this plant include furniture and wooden novelties of various kinds, cedar chests, fancy columns, children's furniture, card tables, waste baskets, screens, and smokers' sets. The lumber is received as rough planks, and is steam-dried in kilns. It is then planed, cut to desired lengths, and pieces glued together to form the proper widths for table tops, box sides, etc. The stock is later sanded, bored, and assembled after being scraped, planed, and cut to exact dimensions. In the finishing room the articles are stained, shellaced, sanded, and varnished. The shellacing and varnishing are done by the vaporising method. The panels for screens, covers for card tables, etc., are made in an upholstering department. All the metal parts, such as hinges, escutcheons, corner-pieces, are punched from sheet metal, plated, and finished at the plant. Some metal work, such as the construction of steel bedroom safes, is also undertaken.

The advantages claimed by the use of individual motor drive are: The production has been increased without adding men or machines, as the machines can be arranged for the quickest and most economical handling of material, without regard to structural conditions. In one plant 30 per cent. more lumber was cut with motor drive than was possible with line-shaft drive. Lighting conditions are improved, for the overhead shafting and belting are eliminated and less artificial light is required. The company state that a great waste of power has been eliminated, as the line-shaft friction losses formerly were over 200 h.p., whereas now not over 200 h.p. is required to drive the machines, and also that the quality of the work is improved by having a motor for each machine, since, with no belt slippage, a constant cutting speed is obtained. A fluctuating change in the cutting speed of a machine reduces the quality and quantity of material turned out. The speed of each machine can also be regulated to suit the work being done on it.

According to the management, maintenance expense is greatly reduced because of the elimination of large and expensive belts. If one machine is shut down for repairs, or if overtime work is required, no other machines are affected. Then, again, with line-shaft drive time is wasted by employees waiting for repairs. It is also stated that the fire hazard is reduced, there being no oily hangers liable to spontaneous combustion; the superintendent lays emphasis on this point.



Belt sander with motor overhead.

The capacities of the motors installed and the types of machines operated in this plant are given in the accompanying table. The illustrations show a power feed rip-saw with motor direct connected, a belt sander with motor secured to planks above the machine, and a battery of boring machines attached to motors by short belts.

Motor Equipment

The plant, working at full capacity, employs 400

Motor irect connected to power feed rip saw.

men. There are 108 motors installed, totalling about 700 horse-power. The average load, without lights, is from 150 to 160 kw. This sometimes jumps up to 190 to 200 kw. when the big motors are running. The two 35-horse-power motors on the blowers are operated continuously. Two-phase, 60-cycle, 240-volt, alternating current is furnished.

Factory Space Efficiency

There is at this time probably no suggestion more timely, more appropriate, or worth more pushing than the idea of securing for machine departments the greatest possible amount of safe working room out of a given floor area, writes C. J. Brown in "The Woodworker." This is what is termed in the above heading —factory space efficiency. It is a branch of efficiency that has not been featured to any great extent by so-called efficiency engineers, but it is something that can be readily worked out in practice The importance of working out this idea lies, to a great extent, in the fact that machine woodworkers cannot turn out good work with any speed when they are laboring in stuffy, crowded quarters. They need ample working room, ventilation, and plenty of light. Until working conditions such as these are provided in factories there cannot be much progress made in the way of economical production or increased output.

This space efficiency idea has already been carried out more or less thoroughly in some of the modern, up-to-date factories and mills. These plants are invariably clean, well-lighted, roomy, and comfortable to work in, and, while there is perhaps no oversupply of floor space, there is plenty of working room and truck room; and, what is just as important, there is an element of safety all through the place. This goes a long way toward making a manufacturing establishment really efficient; it puts it in shape for maximum output with a minimum of expense and effort.

There are several very practical ways to increase available working room and floor space without actually building on additions or putting up new buildings. The biggest and most important step in this direction is to eliminate the overhead power-transmission system. Those dust-catching belts, pulleys, and shafts have always interfered with lumber handling, trucking, and machine operation. Besides being in the way, they have obstructed light, shaken the building, and caused trouble in general by getting out of alignment. They have been a nuisance on account of the overhead oil drip, and a bad fire risk because the supporting timbers always become covered with a thick coating of fine, oily dust near every bearing. Then, whenever an overhead belt must be repaired or a hot box cooled, the man who does it is in some one else's way.

The place for lineshafting, if used at all (and countershafts when possible), is under the floor, out of the way. Bolt the hangers to concrete footings and they will never get out of line, nor will the shafting and pulleys ever shake the building. Belts that come up through the floor to a machine do not take up any of the employees' working space at all. Even the guards for such belts are in no one's way, because they are small, compact, and close up to the machine. It is indeed surprising how much valuable working room can be gained by doing away with overhead transmission.

The ever-increasing use of individual motor drive is doing a lot toward ridding manufacturing plants of the unsightly lineshaft. In my opinion, the individual electric drive is the only thing for woodworking establishments. It is neat, compact, and takes up very little room. I have, however, seen the mistake made of hanging motors to the ceiling and belting down to the machines. This is nearly as bad as having an overhead lineshaft; it is poor practice, to say the least. When individual motor drive is used, the place for each motor is either on the floor (or on a shelf), directly-connected close up to the machine, or under the floor with belt connection.

Recently I visited a furniture factory where the latter idea was carried out—that is, the motors were all under the floor and belted to the machines above. It was done, the manager stated, to get the motors out of the way, to keep them clean without boxing them up, to keep them cool and to obtain a more flexible connection. While personally I am in favor of a more direct connection, there is something well worth while in this idea. There is no getting around the fact that a motor below the floor takes up absolutely none of the floor space or working room in the machine room.

Floor motors, however, can often be so located that they will take up none of the actual working room at all. For instance, in coupling up an individual motor to a double-spindle shaper or a continuous-feed glue-jointer, if the motor is set to operate between the countershaft pulleys instead of being coupled out at one end, it will occupy a space that could not be considered working room. This is a very neat, compact connection. It is a good example of securing space efficiency, or, in other words, utilizing available space to the best advantage.

Still more head room and working room can be obtained by installing the entire blower system under the floor. This does away with a forest of vertical pipes and that long, dust-covered trunk line leading to a dirty, noisy, vibrating fan. An overhead blower system, with all of its brace wires and supporting brackets, takes up a lot of head room, a lot of working room, and obstructs the light By placing it under the floor other important advantages are secured, besides getting more working space in the machine room. Less piping is required, greater suction is secured, and the fan itself can be bolted down to a concrete base so it will run cool and steady. There are a number of plants where the under-floor blower system is in use, and it is proving very satisfactory in every way.

Too many of our present-day mills still allow disorderly piles of factory scrap, and even heaps of shav-

ings and mill refuse, to accumulate in the machine room. There is certainly no efficiency in this sort of practice, and the sooner the place is cleaned up and kept in order, just that much sooner will there be more working room available. A plant in disorder is sure to breed carelessness among the employees. It is unsightly, inconvenient, inefficient, and very dangerous to work in. Good mechanics will avoid it, and insurance companies will charge an exorbitant premium on it. In fact, it is a wasteful proposition from every point of view.

Another thing that has a lot to do with available working room in machine woodworking departments is the factory transportation facilities. Regardless of whether it is trucks, cars, cranes, or conveyors that move the stock to and from machines on its route through the mill, they should be so managed and operated that the material is always on the move, as nearly as possible, in order to make room for more incoming stock. This is a thing that is often not well managed in plants that are otherwise quite modern and up to date. There is probably nothing more productive of inefficiency than to have material congested in the machine room. It is therefore important—in fact, imperative—to keep everything on the move and advancing in regular order.

When we sum up all of the space that is wasted in machine rooms it is evident that in a great number of so-called modern plants the present working room could be increased, in some cases as much as 100 per cent., without laying a foot of extra flooring. Of course, there are certain plants in which, owing to locality or design, it would be next to impossible to put in effect every idea recommended in this article, but there is no mill in the world that could not make good use of some of these suggestions, if it has not already done so. It takes practical experience, coupled with good judgment, to utilize the floor space of a machine room to the best advantage. It is only when this idea is carried out that we can hope to obtain any real factory space efficiency, or, in fact, factory efficiency of any kind.

Woodworking Industry in Maritime Provinces

Describing the Rhodes, Curry Company's Operations in Nova Scotia—Illustrations of Their Amherst Plant

The Rhodes, Curry Company, Limited, Amherst N.S., operate one of the most extensive woodworking industries in Eastern Canada. Besides the main plant, located at Amherst, there are branch factories at Halifax, Sydney and New Glasgow. The products manufactured at these plants comprise building materials of every description, also school, church, bank and office furniture and wood mantels for dwellings. The latter line has only been taken up recently, but it is one of the lines the company is pushing extensively.

The plant at Amherst is well situated for the collection of raw material and for the distribution of the finished product. Shipments can be made either by rail or water. The company have recently extended their markets considerably in Eastern Canada and have also made aggressive efforts to capture export trade. These efforts have been largely successful and shipments have been made to the interior of South Africa and other distant points.

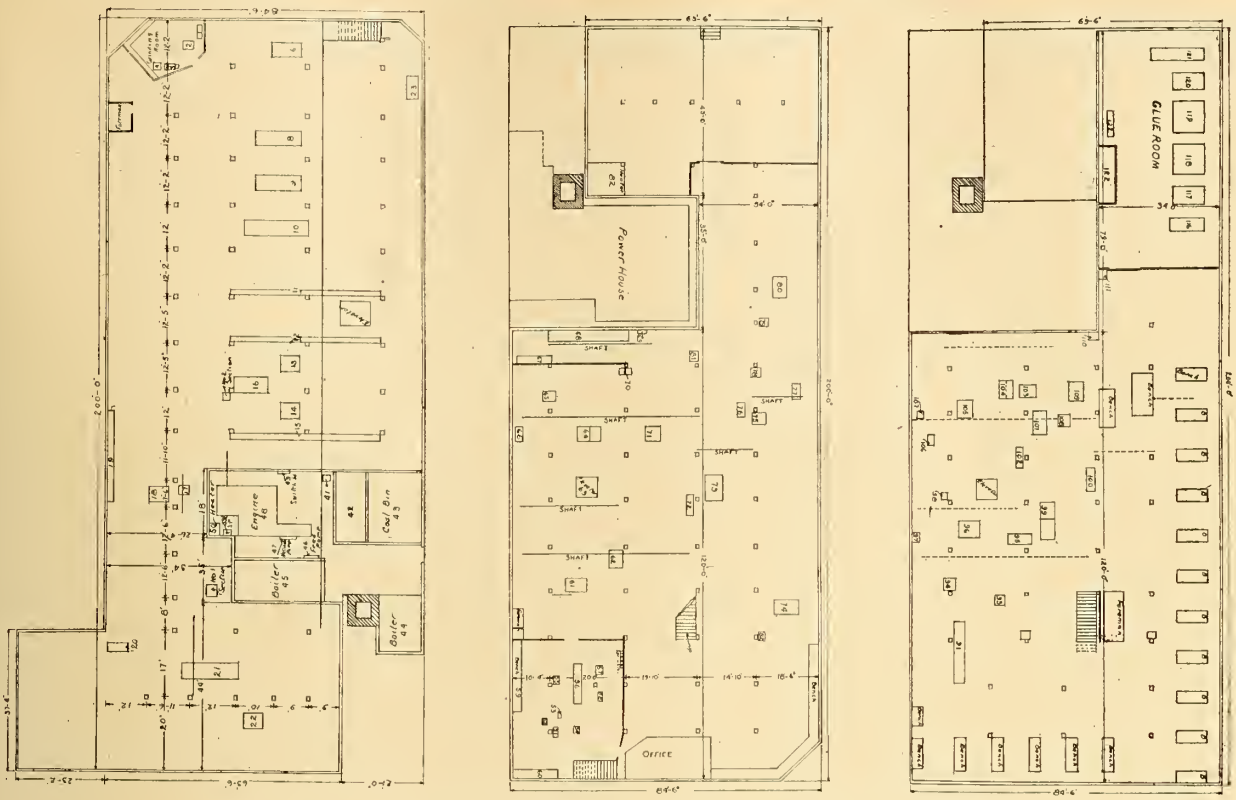
Corner of planing room, Rhodes, Curry Co.'s plant.

Extensive additions have recently been made to the factory at Amherst. The buildings have been extended over 400 feet, new machinery has been installed, and new dry kilns built having a capacity of 6,000,000 feet per annum. Extra sidings have been laid, steam heated warehouses have been erected to house the finished products, and all modern conveniences have been adopted for handling an increased output.

The accompanying drawings showing the layout of the roomy and well-arranged shops and the list of equipment will give the reader some idea of the extent of the Rhodes, Curry Company's operations. The photograph shows a section of the planing room. As a feeder to this factory and yards the company carries on large lumbering operations, so that they are in a very favorable position for turning out large quantities of finished work. From their own timber limits they cut annually from three to ten million feet. They have a capacity of 30 000 feet per day of spruce flooring, roofing and sheathing.

List of Equipment

No.	Machine	Maker
No. 1	Emery	Hartt Emery Wheel Co., Hamilton, Ont.
No. 2	Grinder	
No. 3	Saw Gummer	
No. 4	Grinder	Berlin Machinery Co., Hamilton, Ont.
No. 6	Straight Mldg.	Goldie McCulloch Company, Galt, Ont.
No. 8	Matcher	
No. 9	Matcher	S. A. Woods Machinery Co., Boston, Mass.
No. 10	Berlin	Berlin Machinery Co., Hamilton, Ont.
No. 11	Saw	Clark Demill Company, Hespeler, Ont.
No. 12	Saw	Clark Demill Company, Hespeler, Ont.
No. 13	Rip Saw	Berlin Machinery Co., Hamilton, Ont.
No. 14	Rip Saw.	Goldie McCulloch Company, Galt, Ont.
No. 15	Saw	
No. 16	Blower	Cowan & Company, Galt, Ont
No. 17	Dowel Mach.	J. Ballantine & Company, Galt, Ont.
No. 19	Saw	
No. 20	End Matcher	McGregor & Gourlay Company, Galt, Ont.
No. 21	Moulder	S. A. Woods Machine Co., Boston, Mass.
No. 22	Rip Saw	Berlin Machine Company, Hamilton, Ont.
No. 23	Boring Machine.	Greenlee Bros., Rockford, Ill.
No. 53	Emery Wheel	
No. 54	Emery Wheel	
No. 55	Drill	
No. 56	Machine Lathe	Putnam Machine Co., Fitchburg, Mass.
No. 57	Drill	
No. 58	Emery Wheel	
No. 59	Bench	
No. 60	Filer's Bench	
No. 61	Band Saw	W. W. Carey, Lowell, Mass.
No. 62	Saw	W. W. Carey, Lowell, Mass.
No. 63	Elevator	
No. 64	Saw	Cowan & Company, Galt, Ont.
No. 65	Tenon	Cowan & Company, Galt, Ont.



First, second and third floor plans of the Rhodes, Curry Company's plant.

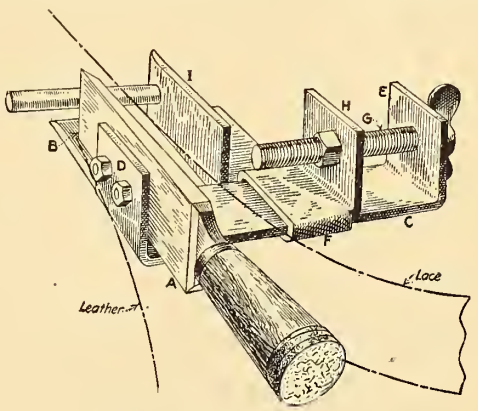
(Numbers on machines correspond with numbers in list of equipment.)

No. 66	Mortise	New Britain Mach. Co., New Britain, Conn.
No. 67	Wood Lathe	
No. 68	Wood Lathe	
No. 69	Drill	Goldie & McCulloch, Galt, Ont.
No. 70	Saw	
No. 71	Surface Planer	McGregor, Gourlay Company, Galt, Ont.
No. 72	Buzz Planer	Cowan & Company, Galt, Ont.
No. 73	Sander	P. B. Yates Machine Co., Hamilton, Ont.
No. 74	Door Cramp	Cowan & Co., Galt, Ont.
No. 75	Tenon	Witherby, Rogg & Richardson, Worcester, Mass.
No. 76	Sash Sticker	Cowan & Company, Galt, Ont.
No. 77	Dove Tail	L. Houston Co., Montgomery, Pa.
No. 78	Sash Mortise	Greenlee Bros., Chicago.
No. 79	Sander	
No. 80	Sash Cramp	Canadian Machinery Corp., Galt, Ont.
No. 81	Mortise	L. Houston Company, Montgomery, Pa.
No. 82	Glue Tank.	
No. 83	Sash Trimmer (Portable)	L. O. Heald & Son, Barre, Mass.
No. 91	Belt Sander	J. Ballantine & Co., Preston, Ont.
No. 92	Glue Tank	
No. 93	Sander	
No. 94	Band Saw	Cowan & Company, Galt, Ont.
No. 95	Cut-off Saw	
No. 96	Tenon	Canadian Mach. Corp., Galt, Ont.
No. 97	Boring Machine	Clark, Demill Company, Hespeler, Ont.
No. 98	Mortise Machine	Canadian Mach. Corp., Galt, Ont.
No. 99	Shaper	J. Ballantine & Company, Preston, Ont.
No. 100	New Buzz	P. B. Yates Machine Co., Hamilton, Ont.
No. 101	Shaper	
No. 102	Buzz	S. A. Woods Machine Co., Boston, Mass.
No. 104	Saw	Baker Bros., Toledo, Ohio.
No. 105	Planer	P. B. Yates Machine Co., Hamilton, Ont.
No. 109	Saw	Fred. A. Cheney, Boston, Mass.
No. 110	Glue Tank	
No. 111	Water Tank	
No. 116	Door Press	
No. 117	Door press	
No. 118	Door Press	
No. 119	Door Press	
No. 120	Door Lress	
No. 121	Door Press	
No. 122	Hot Box	

The accompanying table shows the list of equipment in the Rhodes, Curry Company's Amherst plant.

Gauge for Splitting Belt Lace

A practical device for splitting belt laces can be easily and quickly made as follows: It consists of three principal parts. A is a knife or wood chisel, sharpened at the end, and cuts with the front edge B. It is fastened to the bent-up part of C (marked D), which is made of brass or iron plate, with two small bolts. The opposite end E is likewise bent up, after F has been slid on, and has a hole for the adjusting screw G. The third part F is made so that the loop F can slide over C, and part H also has a hole for the adjusting screw.



Showing how to split belt laces.

A guide I for the side of the leather has a top guide, which serves to keep the leather down flat.

The leather is placed on the floor or bench and the screw G adjusted to the desired width of the lace. A cut three or four inches long is first made in the leather the width of the lace and serves to get a right start. This part of the lace is put between the knife and the guide, and the leather is held with the left hand while the right hand pushes the device forward, raising the leather slightly from the bench.—B. Z. Reiter, in Power.

The Disposal of Sawdust and Shavings*

Author Says in Burning Best Results can be Obtained with "Dutch Oven" Furnaces—Other Uses to Which They Can be Put

Sawdust and shavings form one of the greatest unavoidable wastes of the lumber and woodworking industries, and every year witnesses the destruction of millions of cords, sometimes at no inconsiderable expense to the operator. The profitable utilization of this enormous amount of material warrants very careful thought and consideration, and it is in the hope that the meagre information available concerning the many and varied present uses will be of help in stimulating thought and research along these lines that this article has been prepared.

Dry sawdust is handled in most large cities by companies who make it a specialty. A very large portion of this sawdust is obtained from woodworking establishments, such as planing mills, sash and door factories, furniture factories, and so forth, and is hauled in wagons to the plant of the sawdust company and thence in bags or bulk to the ultimate consumer. Whenever possible the local supply of sawdust is used, but it frequently becomes necessary to ship it several hundred miles, and in not a few cases certain grades of sawdust have been shipped several thousand miles. It would not be profitable to ship the cheapest grades of sawdust over long distances under normal conditions.

In general, each species of hardwood sawdust is kept separate, or mixed only with dust of similar species, whereas softwood sawdust is usually mixed irrespective of species, an exception being in the case of pine, which is frequently kept separate.

There are many grades of sawdust adapted to various uses, and it is one of the functions of the sawdust companies to keep on hand supplies to suit the diverse needs of their customers. Sawdust is graded not only according to species but also according to fineness. Special sifting screens are installed by the companies, and practically any specification as to fineness can be met. It is more or less common to sift softwood sawdust, but much of the hardwood sawdust is either sifted or obtained in various grades direct from the factory. Thus resaw sawdust might be considered one grade, whereas dust from sanding machines would be another. This latter is frequently known as wood flour, though quite different from the wood flour used by explosive manufacturers and makers of linoleum.

Heat or Fuel Value

Practically every large sawmill in the country consumes most of its sawdust under the boilers, and many of the woodworking plants do likewise. Dry sawdust can be burned with fairly good efficiency in an ordinary coal-burning furnace, but it has been found impracticable to burn green or wet sawdust in this manner. Practically standard for this purpose is the "Dutch oven" furnace, which provides ample grate area and combustion space to allow the sawdust to dry out and the combustible gases to burn before they strike the comparatively cool steel of the boiler. Advanced practice both here and abroad rather favors the step grate, with horizontal air openings, and the general slope of the grates equal to the angle of rest of sawdust, since this provides a bed of uniform thickness and air inlets which cannot easily become clogged.

Sawdust has to a very small extent been used as a fuel in gas producers, and has apparently given complete satisfaction in every way. It is necessary, however, to mix with it a certain amount of hogged chips, say, about 50 per cent., to prevent the sawdust from packing and cutting off the draft. The formation of blowholes is also prevented. The sawdust can be quite green—in fact, it is necessary to have moisture present in the producer, and its introduction as moisture in the wood has proven to be an ideal method.

The use of sawdust in the manufacture of fuel briquettes has not developed to any great extent in this country, though a plant has been in operation in Los Angeles for several years. A plant has also been erected in Vancouver. In both of these the briquettes manufactured are cylindrical in shape, being about 3½ in. in diameter, and of varying length, the most usual length being about 12 in. In Europe somewhat greater progress has been made, but even there the path of progress has been strewn with many failures.

So far as known, no fire-lighters of sawdust are produced in this country, but reports from Europe indicate that their manufacture is quite an industry. The sawdust is mixed with resin or pitch and pressed into the form of cakes, which are scored to allow small pieces to be broken off with ease. Special machines for the making of these cakes are on the market.

In the manufacture of porous clay bricks and tile it is necessary to mix with the clay some substance which will be consumed during the burning, and leave the finished product filled with fine cavities or pores. For this purpose either sawdust or finely chipped straw are used. The sawdust should be dry and sifted, so as to produce uniform results. Wet dust would undoubtedly tend to form lumps, and would be hard to handle for this reason.

It is quite possible to obtain an illuminating gas of high calorific value from the distillaton of wood under high temperatures, and several plants have been erected in the Pacific Northwest to operate upon this process. At least one of these has suspended operations, but it is reported that this was due to no fault in the process. The plant is very similar to the ordinary coal gas plant, and the wood is distilled in ordinary gas retorts. The resulting charcoal can be used directly under the ovens, or can be burned in a water gas retort, the gas from which can be turned direct into the mains.

Railroad signal rockets are composed of grease and sawdust pressed into a tube.

Sawdust and wood flour are used in various kinds of fireworks which are intended to burn for a time, rather than to explode. The sawdust is mixed with the color-producing and inflammable matter, in a manner similar to that employed in the making of signal rockets.

The potash contained in wood ashes can be recovered by a simple leaching process, and there are now a number of plants throughout the country engagd exclusively in potash recovery. If the potash is desired as a fertilizer it is not necessary to leach it out first,

*(Extracted from paper prepared by Rolf. Thelen, United States Forest Service.)

since the ashes can be spread upon the ground and the potash allowed to leach out through the action of the rains.

Absorption

The use of sawdust as an absorbent on floors is one of its most widespread uses, and one for which almost any kind of dry, non-resinous sawdust seems entirely suited. Some of the places which use sawdust for this purpose are meat and fish markets, barrooms, hotel kitchens, abattoirs, machine shops, garages, factories, and warehouses. It is used on rainy days to keep entryways dry and to prevent slipping.

Both shavings and sawdust are largely used as bedding in stables, and sometimes sawdust saturated with dilute acid is used in the stalls to neutralize the ammonia.

The use of sawdust as a cleaning and drying agent for metals seems rather widespread, especially in manufacturing operations. Metals which have been cleaned in a pickling bath, or have been in a plating solution, greasy pieces made on automatic machinery in which they are deluged with a stream of oil, jewelry which has been washed, can all be dried in sawdust and polished to good advantage by agitation in a tumbling barrel or otherwise. Dry sawdust is, of course, essential.

Furs are cleaned by being tumbled in drums with sawdust, which absorbs the grease and dirt. Sifted hardwood sawdust of the finer counts is used for this purpose. Furs are also cleaned by hand in a similar manner. In many cases the process may be expedited by the use of some solvent which is absorbed by the sawdust.

Sawdust mixed with asphalt is said to be used in Europe for the damp-proofing of basement walls.

Finely-sifted pine sawdust is said to be used with much success for dressing wounds.

It is reported that perfumed sifted sawdust is still used in France for drying ink, in place of sand or blotting paper.

The use of wood flour and of sawdust in the prepartion of various kinds of food has been reported a number of times, but we have no authentic record of the commercial success of any of these foods.

Reports from dealers in sawdust indicate that the use of sawdust for the protection of fresh concrete from too rapid drying is becoming popular. The sawdust is spread in a layer three or four inches deep over the fresh concrete and thoroughly wet down. It thus forms a protection and at the same time provides some of the moisture which is needed for the proper setting of the cement.

The manufacture of floor sweeping compounds is a well-established industry, and there are a number of companies regularly engaged in it. In most of these compounds sawdust, sand, and oil are used in varying proportions, depending upon the particular use to which the compound is to be put. If it is to be used upon highly-polished floors, the sand may be left out entirely, since it is liable to scratch the surface. It is probable that the most common sweeping compound is the home-made variety, which consists of ordinary damp sawdust.

The name "wood flour" is applied to a number of different kinds of finely-divided wood, and is sometimes used interchangeably with "wood pulp." Very fine grades of sawdust, such as those produced on sanding machines, are often known as wood flour. So also are those grades which are produced on steel burr wood flour mills. These grades are usually produced from sawdust. There is another kind of wood flour, however, which is produced in mills of the grindstone type; this is the finest and most expensive wood flour on the market, and is used principally by explosive manufacturers and makers of inlaid linoleums. This wood flour is made from solid wood, to which a small percentage of sawdust may be added. It is not desirable to have a large percentage of sawdust present, since it tends to clog up the mill.

Dry scrubbers in gas plants are very frequently filled with excelsior, sawdust, or shavings, which remove from the gas the small amounts of tar which have not been removed by the wet scrubbers.

Inertness

Although a comparatively small amount of sawdust is used as a filler in composition floors, the composition flooring industry has had a rather satisfactory growth in recent years, and promises to continue growing. There are now probably over twenty concerns in this country which make and lay composition flooring. So far as we can find out, all these floorings are made with a base of magnesium oxychloride, which is formed by the reaction between magnesium oxide and magnesium chloride. A number of substances are used as fillers and coloring agents; sawdust is one of the fillers. This is usually sifted hardwood sawdust, No. 36 mesh, though sometimes a mixture of hardwood and softwood sawdust is used, and occasionally wood pulp or wood flour is usd. The percentage of sawdust in composition floorings varies from about four to as high as fifty.

In addition to compositions of the type just described there are numerous artificial woods, prepared by mixing sawdust with such binders as ox-blood, starch, glue, flour, and aluminic sulphate, and then pressed into the desired forms. It is reported that these substances are made on a commercial scale in Europe, but so far as we know, their use in this country is rather limited. There are, however, some types of toys made in this country which are composed in large part of compositions with a sawdust or wood flour base. Many other compositions, such as bakelite and the compositions used in the manufacture of phonograph records, have a wood base, but could hardly be classed as artificial wood.

Numerous reports which have been published from time to time mention the use of sawdust in the mixing of all kinds of cements, mortars, and plasters, but there seems to be little real information to be had. The use of sawdust in place of sand in the making of cement barn floors has been found, in at least one instance, to be very satisfactory, and to produce a floor which was warmer and less wearing on the hoofs of the cattle than ordinary cement, and the report states that after several years the floor was still in as good shape as when first laid. However, a number of reports on similar work do not bear this out.

Sawdust is often used in composition floors which are to be covered, and to which it is desired to nail the covering, the sawdust making the floor light and porous, so that the nails can be driven. It is reported to be used in mortars and plasters for similar purposes; in the plasters, sawdust or finely shredded wood are used to help bind the mass together. So far as we know, the use of sawdust for these various purposes is very limited, with little chance for immediate expansion.

Box Making—Arrangement of Machine Floors

Efficiency in the Handling of Materials Essential—Illustrations Show Layouts of Several Plants

By A. B.

The profit to be derived from a box factory depends to a great extent upon the arrangement of the various buildings, together with the means for handling the material from its raw form to the finished product and the disposal of the waste. A good arrangement for a box factory that was erected on a piece of irregular shaped ground is shown in Fig. 1. The piece of property was triangular and bordered on two sides by streets, with the long side fronting on the railway.

The arrangement illustrated has effected the simplest movement of material from the receiving building on the railway line through the main shop and out to teams, by which the greater portion of the deliveries

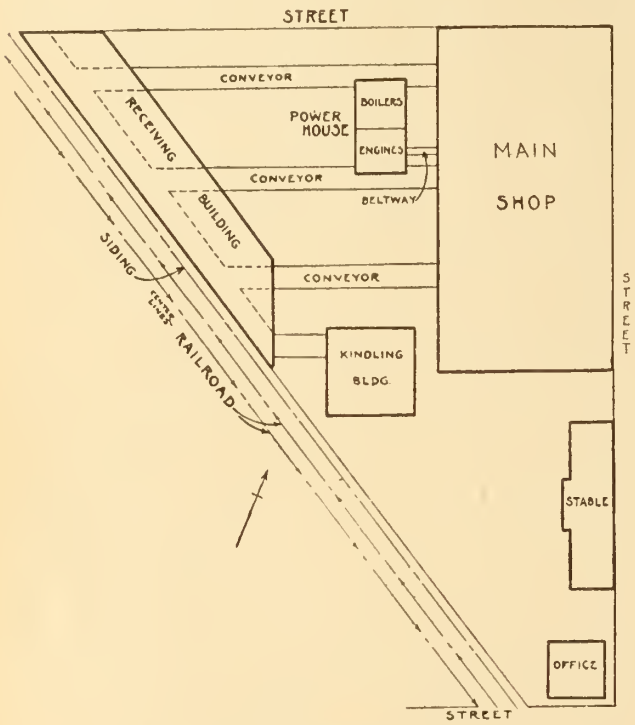


Fig. 1.—Box factory on irregular shaped site.

are made. The raw material is taken from the receiving buildings to the main shop by roller conveyors, which deliver the material into the feed rolls of the planers located on the top floor of the main mill.

The cut-off machines, feeders, trimmers, and matchers all produce a considerable amount of sawdust as well as end clippings. Under each machine is a hopper through which this waste material is delivered to a conveyor located overhead on the storey below. These conveyors deliver to a common conveyor running at right angles. This latter feeds a hopper provided with a screen of such mesh that the sawdust drops through, while the end clippings pass over the screen and on to another conveyor which runs outside of the main building and delivers the end clippings into the upper part of the shaving bin in the boiler house. This material is then shovelled by hand from the bottom of the bin hopper into the boiler for fuel.

For handling the sawdust there is a blower system by which the material is carried to the roof of the main building where it is delivered into a bin.

For collecting the shavings there is a second blower system independent of the sawdust system. There are connections from the heavy planers to the fan, whence two pipes lead to the shavings bin on the top floor of the kindling building and to a collector on the top of the boiler house respectively. From the latter five discharge pipes lead, one to the shavings bin already mentioned, and one to each of the four boilers. At the point where the delivery pipe from the fan branches so as to go to either the boiler house or the shaving bin, a switch and percentage valve are located. This is to permit the boiler tender to keep an even air pressure on the fire beneath his boilers. The switch is connected up for operation directly from the boiler room floor.

A fourth system is in use for handling kindling wood. Strips are collected from the trimmers in boxes and wheeled to the kindling saws which are located near the end of the main mill opposite the kindling building. These saws cut the wood into proper lengths for kindling, the pieces dropping into hoppers under the machines and then onto an inclined conveyor which delivers to a horizontal conveyor located overhead in the first storey. The latter drops onto a belt conveyor which delivers the kindling into a large bin at the top of the kindling wood building. This bin is of sufficient length so that carts may be driven in on the lower floor and be filled directly from the bin above.

As the power in this plant is entirely mechanical, all these conveyors and fans are operated by belts from the various line shafts. Wherever conveyors traverse open spaces between the buildings they are carefully housed in against the weather. The entire conveying system is so arranged that it will be a matter of little difficulty to add one-third to the equipment when the final six sets are installed in the main factory.

Production in Medium Sized Factory

The system of production used in a medium sized box factory the writer visited recently is as follows: The lumber is conveyed by means of hand trucks to the band re-saw, which cuts the lumber lengthways, taking 1 inch to 6 inches in size. The planer, to which the boards go next, has a capacity of 15,000 feet per day. The other machines on the ground floor are a double surfacer, planer, dresser and matcher, and a double cylinder.

After the lumber has been dealt with here, it is stocked so as to be handy for the cut-off saws, of which there are three. The boards are cut into the requisite lengths and then sent to the rip saws and ripped to width. The waste is stored in racks according to size, ready for use when orders are received suitable for this description of lumber. Two box board matchers are on the same floor. The waste that is left is cut into lengths and sold, the firm thus disposing of every bit of lumber that comes into the mill.

The next process, after leaving the matcher, is the nailing, for which there are two machines. One does

the cleating of the ends, and the other completes another portion of the job by nailing the sides, this being known as a twelve-nail machine. The covers and bottoms are put on by hand labor, the men being very expert in this portion of the business.

The firm makes cases and boxes, as well as crates of all kinds. For certain boxes, a combined disc and drum sander is used, in order to give a better finish. For cases and boxes spruce, basswood, red and white pine are mostly used, 5/8 to 3 inch being the general sizes.

Efficient Routing of Material

Fig. 2 is a plan of a box-making plant where the operations are all carried out on one floor. The lumber enters the factory from the yard at one end and goes out at the other end in the form of finished boxes. This

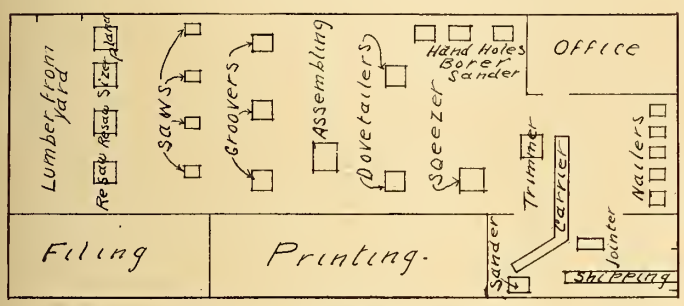


Fig. 2.—Showing arrangement of machines.

is the ideal arrangement when it can be carried out with a minimum of handling of the stock, and it seems to have been well taken care of in the plan under discussion.

The lumber goes to the resaws and from there to the sizing machine and planer. It then goes to the rip and cut-off saws and on to the groovers. The other machines, for cutting hand holes boring, sanding, dovetailing, squeezing, trimming, nailing, etc., are arranged in convenient positions. After the operations are finished on these machines the boxes are placed on a carrier and conveyed a short distance to the jointer and sanding machine, and from there to the wagons, as the firm's trade is almost exclusively local. The printing department and filing room are off the machine room.

The Users of Dowels

Subscriber writes: "Can you give us any information as to where we would find a market for birch or soft wood dowels? We have a considerable quantity of good hardwood edgings left over from the shell box business, and thought if we had a market for them made into dowels it would greatly assist us in disposing of these edgings, which are too good to go into the kindling wood pile."

Answer.—The chief users of dowels are the chair people, furniture people, refrigerator people, and sash and door people, although most of the latter make their own dowels. Dowel pins, of course, are used in almost every woodworking industry to a greater or less extent, and there are many firms who make a business of jobbing dowels. In addition to the dowel pins there is a larger market for small rods for flag-sticks, meat skewers, handles of different kinds, chair stretchers, and hundreds of other articles.

The man of genius creats circumstances; the man of talent uses them; but the fool looks at them without seeing them.

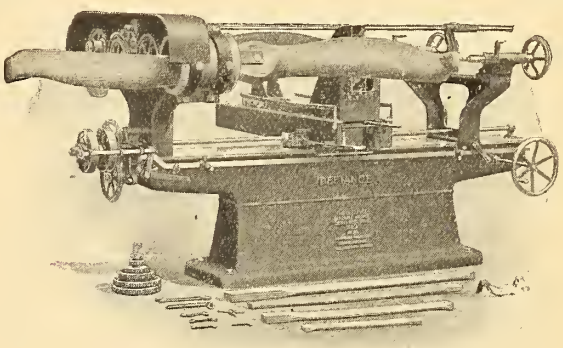
New Aeroplane Propeller Turning Lathe

A new aeroplane propeller turning lathe, as illustrated herewith, has been designed by the Defiance Machine Works, Defiance, Ohio, expressly for the turning of propellers and struts for various types of aircraft. It is made to automatically turn propeller blades of any size to any shape or pitch. The company state that this machine, with a single operator, will accomplish the work of eight or ten skilled workmen. It ensures correct shapes and will duplicate propellers of any design to exactness. The machine is the latest adaptation of the well-known Defiance copying lathe, which has proven a success for turning various shapes of extreme irregularity.

Describing the mechanism of the machine, the company say: "A hollow chuck is used when turning propellers on this machine, as each blade of the propeller is turned separately. The propeller is clamped in this chuck by means of a pin, which is inserted through the hub, holding it securely and centering it accurately. This chuck is also used when turning struts that measure over five feet in length.

"The cutter-head is fitted with six right and six left-hand knives to feed both ways, and will turn either hard or soft wood. It is mounted upon a sliding frame and supported by a substantial carriage, which travels across the path of the material to be turned by means of a heavy feed screw driven by double-friction pulleys. These latter are operated by a convenient hand-lever for starting the feed, which is automatically disengaged when the end of the cut is reached. The frame supporting the cutter-head and guide roller is gibbed to the carriage, and vibrates in a path to correspond with the shape of the model placed in the machine.

"The feeding mechanism which controls the cutter-head carriage is arranged to feed from right to left or from left to right alternately, or it may be adjusted to feed in one direction only. The starting station may be at the right or left-hand end of the machine, as desired. It has five changes of feed, from 1/8 inch to 3/8 inch, varying 1/16 inch to each revolution of the work being turned, and it can be started or stopped instantly at any position of the cut. At the slowest rate of feed



Aeroplane propeller lathe.

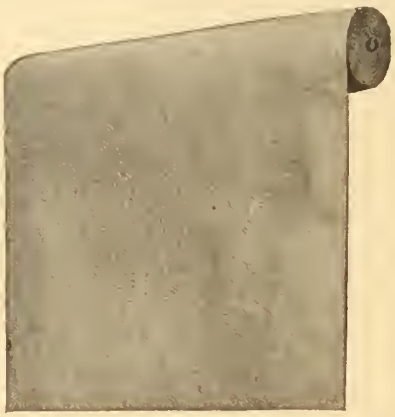
it will turn 2½ inches per minute, and at the fastest rate 13 inches per minute. Adjustable stops are provided for automatically regulating the length of travel to the cutter-head, which can be instantly set for any length of turning within the range of the machine."

This machine is in use in the Curtiss aeroplane factory, and installations are being made by the Dayton-Wright Aeroplane Company, as well as several other aeroplane propeller manufacturers.

Upholstering and Trimming

The Manufacture of Fabrikoid*

The base of Motor Quality Fabrikoid is always a specially woven fabric. This fabric is of cotton, and is so designed as regards the number and size of the threads in the warp and woof that the finished material will have at least twice the tensile strength of split leather. The manufacturing processes in our plant begin with the inspection of this cotton cloth. Every inch of it is carefully examined by experts, to detect any unevenness, loose ends, or other flaws in weaving.



Roll of fabrikoid.

It is also counted for the number and size of threads, checked up for length, and the actual tensile strength determined on our own testing machines.

We find that this extreme care at the start is fully justified in the completed product, and that, having once started with a material that is absolutely uniform throughout, we can keep the same under exact scientific control through every subsequent process. After being inspected, the cloth—called grey goods—passes into another room, where it is run through the dye vats. We are especially careful to use the best dyes obtainable, many of which are made in our own laboratories, and our process guarantees a permanent, unfading surface. The treatment received in the dyeing vats also shrinks the material so that the completed product can be depended on not to stretch or sag.

The fabric next goes to the drying room, where it is run over revolving dry cans, properly heated for the purpose. When thoroughly dried it is ready for the special processes by which we obtain the soft, leather-like feel of Motor Quality Fabrikoid, the machinery used being specially designed for the purpose.

The next step is the coating process, conducted in several separate buildings devoted to the necessary operations. In these buildings the fabric is run off of rollers through long coating machines. During its progress through these machines the pyroxylin coating solution, previously colored with the proper pigments, is applied and firmly anchored in the fabric base. The tough, wear-resisting surface of Motor Quality is a result of many years of expert development of the means and methods of applying this coating and of painstaking care in their employment.

From the coating machines the goods now goes to the unembossed stock-room, where it is given a thorough inspection to eliminate any rolls that are not perfect, the perfect goods passing into the embossing room. Embossing is an important process with both leather and leather substitutes. Much depends upon the fidelity with which the markings of genuine grain leather are duplicated, as well as upon the permanency of the impression. Some idea of the importance of this process to us can be gathered from the fact that Fabrikoid is furnished in about sixty different grains, some conventional, but the majority being exact reproductions of the natural hide grains of various animals.

We spare no cost in searching for and securing hides that show the most beautiful and characteristic markings, and our embossing plates and rollers are made by a special process that reproduces these markings to the most minute detail. Our insistance upon this feature and our embossing process itself give us a distinct advantage over leather. We heat our plates and rollers to a temperature that is higher than is possible with leather without ruining it, and we use a plate pressure of many tons to the square inch. In the very deep grains we use a pressure at which leather would cut through, but our film and fabric are elastic enough to stand deep grain as well as high temperature; and, as a result, the grain on Fabrikoid is as permanent as the material itself.

Arm chair upholstered with fabrikoid.

After passing through the embossing machines Motor Quality Fabrikoid, excepting that which appears in the Moorish or hand-Spanish effects, is virtually finished. These Moorish two-tone effects go through a special hand treatment in a separate building, where experts apply a series of pigments, washes, and solvents to obtain the desired results. All colors of Motor Quality go next to the final inspection room.

*Data prepared by DuPont Fabrikoid Company, Wilmington, Del., U.S.A

Here we have increased our inspection facilities to the extent that we inspect all finished material by daylight, although our other processes are in operation throughout the whole twenty-four hours. In the inspection room the rolls of Fabrikoid are also measured and tagged, and then go to the shipping room, to be wrapped and cased.

Perhaps no clear conception of the manufacture of Fabrikoid can be had without understanding a little about the coating solutions used. These go by the general name of pyroxylin solutions. The base of all of them is raw cotton, which is first nitrated and then dissolved in various solvents. The DuPont Fabrikoid Company are the only manufacturers in America who nitrate their own cotton, dissolve it in their own solvents, and, to a large extent, make their own coloring pigments. This gives us a chemical as well as a mechanical control of the entire system of production. It makes it possible for us to assure the public not only that the fabric base of Motor Quality is perfect in every way, but that every successive coating that makes up the protective surface film is especially compounded and properly placed so that the impregnating, the softening, and the wearing portions of the film bear the relations necessary in a scientific piece of goods.

Suggestions for Upholstering Chairs

The two chairs illustrated on this page were made in the cabinet shop of the Royal Ontario Museum, in Toronto. Chairs of this and other patterns have been placed on the various floors of the museum in order that visitors may rest or sit down to examine some piece of work in which they are interested.

They are reproduced here because they may offer a suggestion to the manufacturer who is making chairs for the hall or studio. The chairs, while not sufficiently comfortable for constant use, make very attractive and suitable pieces of furniture if used where they are only sat on a few minutes at a time.

Fig. 1—Chair of pleasing appearance which is easily upholstered.

The frames in each case are of walnut. The upholstering on Fig. 1 is green plush, which harmonizes excellently with the brown color of the walnut. The chair shown in Fig. 2 is upholstered in brown leather; and, while it has not the pleasing contrast of green and brown, yet the brown leather blends nicely with the shade of the walnut.

Fig. 2—Chair upholstered in leather.

The upholstering is not expensive on either of these chairs. The seat on Fig. 1 is made of a piece of cotton material, hair and plush, nicely rounded on the edges and diamond stitched. The stitching adds to the appearance of the cushion and holds the hair in place. Strips of webbing are used on the under side of the cushion to keep it from sagging when sat upon.

The box effect on the chair, shown in Fig. 2 is obtained by having the front and side rails of equal width. There are no springs in the seat. The webbing is stretched across the top of the rails, a piece of canvas placed next, and then the hair. The hair is loop-stitched to hold it in place, and then the top piece of leather is secured in place.

At the top of the back there are two narrow rails, with space between. Over these is placed a piece of thick cardboard and then the leather is put on top.

It is well for us to chart the great seas of inspiration, but we must not forget the little wayside streams that offer us refreshment as we wander along the dusty roadway of life.

Be fair to your men. Pay them as much as local conditions will warrant, provided they give faithful service in return. By this means you build up a loyal corps of employees.

"Safety First" Department

Safety First Slogans

"Behind the clouds the sun is still shining," may apply to a rainy day, but not to the family of the man who lost his limb or life through the thoughtlessness or carelessness of another.

Do not pile material so that there is danger of its falling. You may be the man hurt if you do this.

Do not put off until to-morrow to make the safety suggestion you have in mind. It may save someone a serious accident.

Many accidents are caused by fooling, horse-play, and distracting the attention of others.

The fellow who said "'Tis never too late to mend" was not talking about accidents. The thing to do is to sew up the rip before the accident happens.

A preventable accident is a disgrace to the foreman in whose gang it happened.

The careless workman who does things in an unsafe way is a menace to his fellow-workmen, as well as himself.—Splinters, Weed, Cal.

Protruding Set-Screws

A set-screw at first sight appears to be a harmless thing, but where protruding from the collar on a rapidly-revolving shaft it has proved to be one of the most deadly forms of danger that exists in the factory of to-day, and has, perhaps, been more legislated against than any other one thing. The only sure way to avoid them—if it is impossible to substitute safety collars—is to cover the heads or countersink them, at the same time prohibiting the oiling or cleaning of shaftng while in motion.—Hardwood Record.

Belt and Shafting Guards

The guards shown in Figs. 1, 2, and 3 have been found very useful in plants of various kinds for protecting operators of machines, their assistants, and other men, laborers, etc., working around the factory.

Fig. 1 is a neat and effective guard for a pulley and belt on a countershaft. It can be readily removed to

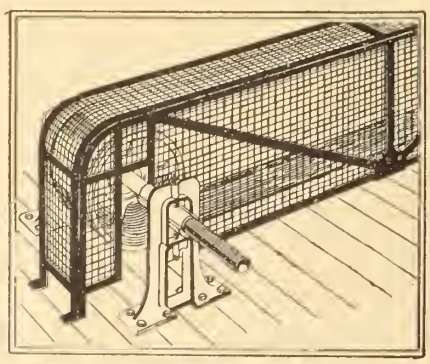


Fig. 1—Guard for pulley and countershaft.

allow of repairs being made to the belt. The frame is made of bar iron and the wire is steel mesh. The meshes are small enough to prevent aprons or articles of clothing from getting caught in the pulleys.

In Fig. 2 is shown a ladder with iron hooks for hooking over the shafting and non-slip ends on the floor. These are the kind of ladders that should always be used for oiling or work of any kind around overhead belts or shafting. In the same illustration is shown a covering for gear wheels. These are one of the particular things a shop employee must be on the watch for. If a loose strap of his overalls or his apron gets

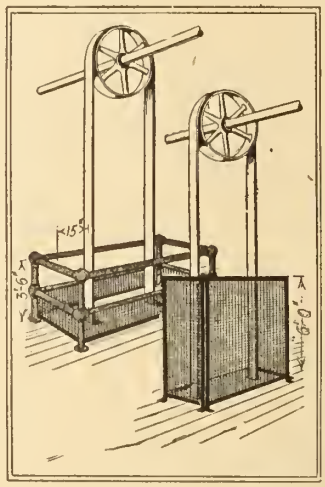


Fig. 2—Two methods of protecting belts that come up through floors from lineshaft below.

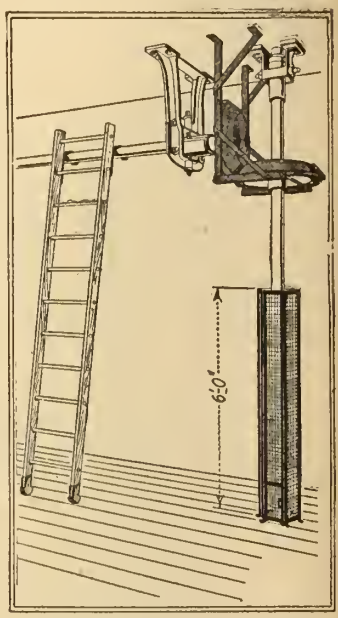


Fig. 3—Safety ladder and gear guard.

caught in a gear, the chances are about ten to one he will be seriously injured.

Overhead gears are even more dangerous than those near the floor because if a man is reaching from a ladder to tighten a set-screw or oil a bearing, he is liable to overlook the gears. It is also advisable to protect upright shafting. This can be done very effectively as shown in Fig. 2.

The guards shown in Fig. 3 are used where belts pass up through the floor from the line shaft to a countershaft on the ceiling. The one constructed of piping forms a good protection. And usually there is enough old piping lying around the plant to make these guards. The other guard in the same illustration is good. There is absolutely no danger of a person's apron coming in contact with the belt when it is used.

It has been said we don't succeed so much on our own acts as we profit by the mistakes of others. And there's a lot of truth in the statement.

Low prices, bad estimating, and unprincipled competition, have done much to bring into disrepute very worthy and respectable callings.

Competition means activity, and activity means life; but we should never interpret competition as signifying the annihilation of profit and the destruction of quality.

It is not a bad plan to utilize some of your spare time in studying points about your business that have not received the attention they should do. You may profit by it.

Modern Methods of Applying Enamel Finishes

By F. H. Alton, Demonstrator and Service Man for the Marietta Paint and Color Company of Marietta, Ohio

The proper method of enameling furniture to secure satisfactory results still seems to be quite a problem with many manufacturers of goods of this class. During the past three years especially there has been a great demand for furniture in this finish, and, as a result, the market has been flooded with good, bad, and indifferent enamels.

With most furniture manufacturers enamel is still an entirely new thing, and very few of the "younger set" of finishers have had any experience with it. Hence they have had to do more or less experimenting, each finisher going it alone and unguided by text-book or teacher.

The manufacturers of enamel have also had their troubles, in that they have had to face abnormal conditions in the purchase of the raw materials. The use of enamels covers a large and diversified field. The intelligent manufacturer requires a wide knowledge of trade conditions—what to buy, where and how to employ the skill to make the raw materials up into the various grades to suit the different uses for which they are intended Profits have never been an easy thing with furniture manufacturers, and, like everything else that goes into the making of his goods, there is a limit to what he can afford to pay for enamel. The enamel manufacturers have to meet this condition squarely.

Before saying anything of present-day methods of applying enamel let us look back only a few years, as time is recorded, and look over at least one or two of the crude methods of enameling as compared to those of to-day. One of these was as follows: Apply a coat of white lead, cut down with turpentine; when dry begin a gradual building-up process, consisting of several thin coats of zinc, reduced with turpentine; one coat applied with the grain of the wood, the next across the grain, and so on until enough material has been applied to cover the wood completely. The zinc was applied thin to keep the brush marks from showing. The last step was to apply about two coats of enamel, made with damar varnish and a small quantity of zinc.

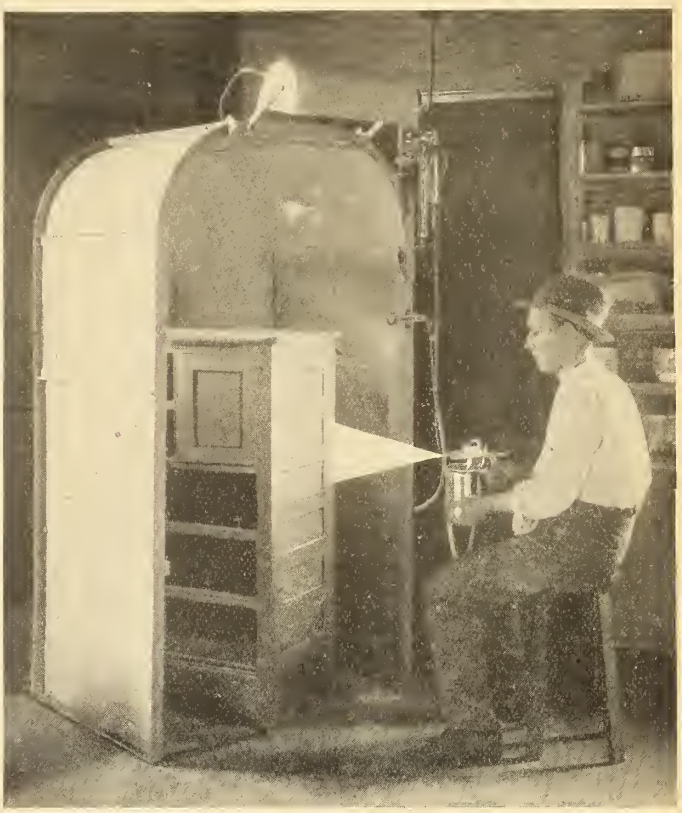
A cheaper method than the above was to apply two coats of zinc cut with turpentine, two coats of the same material with a little damar varnish in it, and then finish with one coat of enamel made up with the damar varnish and a small quantity of zinc.

The old methods were slow. Completing the work was a matter of weeks, not days, as the material dried very slowly. A large portion of the varnish used for the old methods was what is known as cold cut gum, and we still have with us to-day a few manufacturers who are trying to put out enamel made on this basis to the trade. The furniture man who wants good enamel work must first look up and be sure he is getting his enamels from a house that knows the game; a house that is equipped to make good enamels and supply them at competitive prices.

The processes through which the materials have to go, from the heating of the oils and gums up to the finished product, are legion. Presuming that you have succeeded in purchasing the proper goods, let me caution you right here: Don't think because the furniture is to be enameled that any old kind of wood or surface will do.

Preparing the Wood

First of all, of course, the wood must be dry and well smoothed up. Don't use oak or any coarse-grained



The author, Mr. Alton, applying enamel with the air-brush.

wood. The softwoods like gum, basswood, poplar, etc., should first be given a very thin coat of shellac (cut 4½ pounds to gallon), and reduced, using three quarts of wood alcohol to one quart shellac. Mahogany can be used to good advantage when necessary, but should be filled with a light filler, such as is generally used for Kaiser Gray, and a coat of shellac put on thin. When the shellac is dry, sand thoroughly and see that all dust is removed.

For four-coat ivory and enamel work now apply a

coat of flat enamel undercoat. Let this dry over one day, when another coat can be applied. While some prefer the second coat applied the same as the first, it is advisable to add just a small portion of enamel to the second coat, as it adds greatly to the smoothness of the surface. It is possible to get goods that dry fast enough to enable the finisher to apply a new coat every day, but for durability this is not advisable. Better take ten days to finish and have it last than to finish in six days and have it go to pieces.

After the second coat has dried, apply a coat of enamel. Like the undercoats, this should be thinned a little with pure turpentine. No fixed rule for thinning can be followed, as the amount varies with the different makes.

When the first coat of enamel is dry, apply the second and last coat. When dry send to rubbing room and rub with oil and pumicestone to a smooth surface. Clean up thoroughly and high-light all carvings and mouldings, and apply any other decorations desired.

Spraying System Advised

Now, a word to those who are still trying to put on enamel with a brush. If you expect to compete with the best of your competitors; if you wish to lay your enamel smooth and free from unsightly brush marks, quit the brush and install a spraying outfit. It is the only way to lay on enamel in a succession of uniform coats. Besides it has no equal for cleanliness, as there is a constant flow of good, fresh, clean material coming from the container at all times; whereas with the brushing system there is a constant wiping of more or less dirt back into the container. It will be seen at once that if any dirt or dust should be missed in dusting out corners and close places, a brush will drag it over the entire surface. With the use of an air brush it is tied down right where it is.

While the spray is the greatest thing ever installed in a finishing room up to the present time, it does not follow that every user is getting what he should out of the system. In putting in sprays be sure you get everything right. Don't let fifty or a hundred dollars stand in the way of getting everything installed right and of proper size. It will save trouble later on. Get a compresser large enough, and put in the air pipe connection and air tank so you will get a good, clean supply of air, free from oil and water. Don't use elbows in the air pipe. Better bend the pipe wherever a turn is necessary.

Have power enough to furnish 100 pounds of air, and then set your air-gauge where you want it, according to the materials being used. Some of the following pressures for different materials may be found useful:

Shellac, 30 pounds.
Enamel undercoat, 40-50 pounds.
Enamel, 70 pounds.
Varnish, 70-80 pounds.

If you use rubbing machines on this air line, run them on at 100 pounds, especially if oil rubbing. Break in a good operator on your sprays. It is necessary that the foreman finisher master this at once.

Avoid Old Brush Stroke

The writer has visited many factories throughout the country and frequently the foreman will frankly admit that he knows little or nothing about the sprays. This is a serious mistake. The foreman should get into the game and master every detail; then when this or that happens, as it will sooner or later, he will be in position to take hold and straighten matters out. One operator will think he is the only man who can run the machine; another will think if anything happens he has a foreman who can straighten it out for him.

Another thing, bear in mind that an air brush is a spray, not a squirt-gun. Here is where a good foreman comes in again. When you use a spray, get away from the idea of the brush stroke. The accompanying cut shows the proper method of applying a coat of any material. In this cut is shown a chiffonier with the end partly coated. This stroke is made by a swinging motion back and forth across the end, beginning at the top and continuing on down to the bottom of the work. The air brush should be held about 18 inches from the surface

If you do not have a good electric heater on your outfit, better get one at once, especially for the use of enamel and varnish. It limbers up the goods, and this is very much needed, especially in cold weather. These heaters are generally marked "low, medium, and high" temperature. In starting off, set the heater at high; let it run that way for about an hour, then drop back to medium. Let it run at medium unless the room is very cold. Bear in mind, however, that a cold finishing room is a thing that should not exist. Finishing rooms should be kept at a temperature of as nearly 85 degrees F. as possible. This, along with good ventilating, to ensure a plentiful supply of good, fresh, clean air, is one of the greatest aids to proper drying. Much more could be said on this subject which space will not permit at this time.

The Latest Oak Finish

The market this year is practically devoid of any new designs in oak. Furniture seems to be running to walnut and mahogany exclusively. Of course, it is understood there is a certain amount of oak being manufactured, but there is no enthusiasm back of this beautiful wood as far as new designs, new lines, or styles of finish is concerned. The situation has just about reached the stage where the buyer and the consumer will again be looking for this wood in a new creation. This has been realized, and designs are being drawn especially adapted to dining-room furniture with a finish strictly American, the name of which is from Indian origin, Sequoyah, pronounced "Se-coy-ya."

This is a beautiful creation on the gray order, but resembling in no way any of the grays that heretofore have been offered. It differs in one distinctive feature from the fact that it is not filled, but has no white pores to assist the gray shade. When produced on white oak, quartered, either solid or veneer, the flakes by the action of the chemical acid stain produce an effect that may be likened to watered silk. The flake takes on a greater sheen of a similar tone, ashen gray, which plays up in the light from various angles in variegating hues, always blending, however, with the background. The pores of the wood show a trifle darker gray, producing in the entirety a satiny gray, mellow, rich in tone, but not at all aggressive.

It is a difficult problem to give in words a mind picture of this beautiful finish. It is not an expensive finish, but it is a durable finish, and one that can be revived and kept fresh and clean by the use of any of the so-called liquid wax preparations used in our modern spraying machines, ofttimes styled "mineral wax." Hard usage will not affect the finish, the color is absolutely permanent, and from its makeup it is safe to say will gain in beauty as it ages.

The production is diametrically opposite to the gen-

THE SELLING FORCE BEHIND GOOD FURNITURE

MARIETTA WOOD FINISH SPECIALISTS

The finisher sells as much furniture as the salesman. Foremost aids to the finisher are MARIETTA FINISHES *"The stains with brains"*

They anticipate every need of the most modern finishing room. Sum total, net result of years of concentration—of will, of skill, of art, of heart, they are the topmost achievement where the ideal was high.

Ask your most practical finisher.

The MARIETTA PAINT & COLOR CO.
Marietta, Ohio

eral idea of producing finishes, that when it makes its appearance and bid for popularity it cannot help but meet with immediate favor. In these modern days of science, educational people are finding that the light as reflected from our surroundings has much to do with the human eyesight. Mellow tones, reflecting such rays which are not deleterious, are being sought and specified in the furniture fittings of modern educational institutions. Congested districts in our large cities are seeking furniture that reflect the light rather than furniture the tones of finish of which absorb the light. A surrounding of cheerfulness, light shades, substantial and durable appearing, harmonious with the general decorative schemes, are the ones that will supplant the dull and sombre shades which have been predominant in oak finishes.

In connection with this it might be well to say that in modern educational institutions the old-time blackboard is being replaced with that of a deep green shade, the old cherry top desk is being replaced with lighter shades and many specifications in gray. Cafes, rest rooms, store fixtures, offices, etc., owing to the light question, have sought the gray, recognizing the advantages of such color in this respect, and of the general appearance of cleanliness offered in this style of finish.

Sequoyah oak answers the requirements in every respect, but being so far superior to the many efforts in the production of gray, carries with it a distinctiveness, individuality, depicting immediately a superior quality of finish backed up by originality of design construction, and, best of all, is American in wood, style, finish, and name.—Furniture Manufacturer and Artisan.

Enamel Finishes

Finishes in enamel, both white and tinted, have been more or less popular for a number of years, and they continue to hold a fairly respectable place in furniture and cabinet-work.

An enamel finish may be put on almost any kind of wood that will take what is termed natural finish, or stains with varnishes, but some of the woods, and fortunately some of the cheaper woods, seem to work peculiarly well for enamel finish. For example, it is said by those experienced in finishing and who are in a position to know, that gum has superior qualities for taking and retaining enamel finishes. Any kind of gum may be used—white unselected or the red gum. An interesting point about it is that this class of work makes an excellent opportunity for the use of the white part of gum veneer that is good, clear, sound stock, but has no color to commend it for natural finish. Gum of this kind is among the cheapest of the good veneers, and because it takes a polish well and holds the finishing materials well it seems to make a very desirable wood on which to put enamel finishes.

In the application of finishes themselves practices differ. Some use a body made of a series of such materials as white lead, and some use special undercoats called enamel undercoats. When this has thoroughly dried, there is an application generally of two or more coats of enamel, with plenty of drying time allowed between, each coat of enamel being smoothed off with fine sandpaper except the last coat, which may be left as it is or rubbed with pumicestone and water to produce a dull finish. There are some special formulas for unusually high-grade enamel finishes, but it seems comparatively easy to produce a fairly satisfactory enamel finish on gum with very little work.—Veneers.

Varnishing Church Seats

Seats in churches are frequently of pitchpine, upon which varnish takes a long time to harden. The washing down is often done with soap or soda, and not neutralized afterwards with a little vinegar and water. Most churches are wretchedly ventilated, and have a musty dampness that has a prejudicial effect on varnish.

It is always advisable to wash church seats with alum size water, well rinse off, and allow plenty of time to get thoroughly dry. All such jobs should be done in the summer or autumn, so that the doors may be opened to get a nice current of air.

Only a few makers supply a really reliable church-seat varnish. It should be a real hard copal oak. Sometimes a cheap resinous varnish is used, which will soften by the warmth of the sitter's body. The only certain way is to wash clean, dry thoroughly, and use a reputable make of guaranteed hard church oak varnish.—B. L.

It is perhaps a good thing that some people are satisfied, for they could never satisfy anyone else.

The more a veneer user can learn from the experience of others the less he will have to pay for his own exprience.

Don't buy goods that you don't need, nor assume obligations you cannot meet, even though the salesman is insistent.

Peter Hay Machine Knives

Peter Hay knives are made of special quality steel tempered and toughened to take and hold a keen cutting edge. Hay knives are made for all purposes.

Have you our Catalogue?

Made in Canada

The Peter Hay Knife Co., Limited

GALT, ONTARIO

"ENAMELS"

Our business in both White and Old Ivory Enamels and Primers has trebled during the past year

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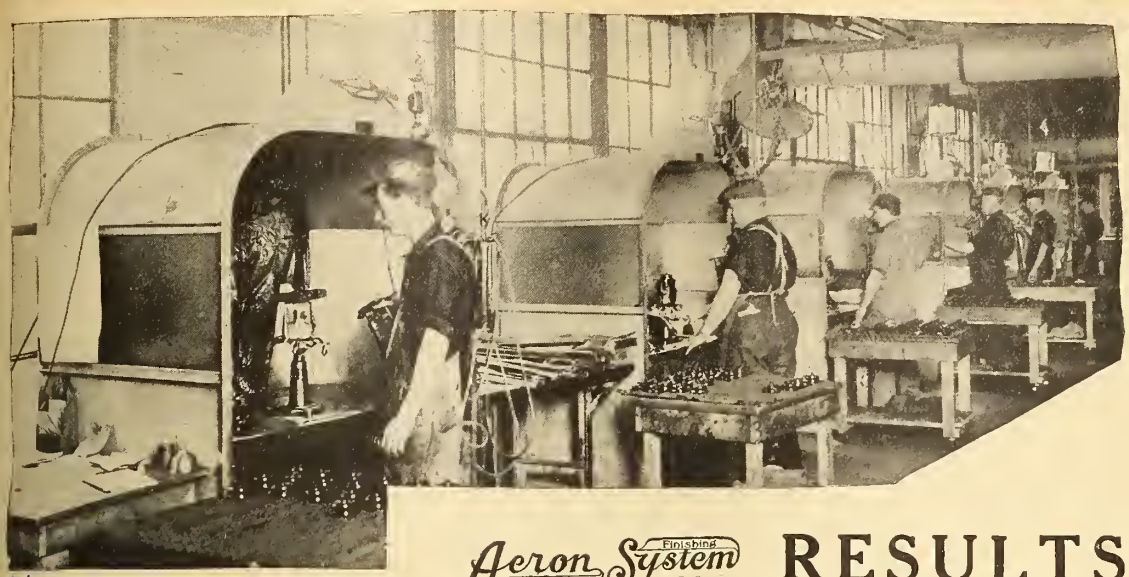

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Veneers and Panels

Jacobean Panelling in South Kensington Museum

By Walter Wrench

The taste for good interior finish is growing yearly in Canada and manufacturers of this class of woodwork find that their customers demand that the work shall be correct and true to type in design and authentic as to details where period reproductions are desired. While it is unlikely that the manufacturer will be called upon to reproduce such rooms in all their details as will be treated upon, yet it will be valuable to have on file such scale drawings and details so that in planning more modest interiors the manufacturer may assure his customer that the design is true to type in every proportion and detail. Should any manufacturer desire to obtain fuller particulars of the Jacobean room described in this article, or of any room in subsequent articles, the information may be obtained from the author.

One of the most interesting examples of early Jacobean interior panelling extant, that from Sizergh Castle, Westmoreland, is housed in one of the lofty galleries of the South Kensington Museum, in London, Eng. The museum authorities attribute this work to the second half of the sixteenth century, and most experts agree with them. I believe this to be true as regards the panelling itself. I think the inlay with which it is embellished is of a somewhat later period. It has no doubt been added at the desire of the owner for a more elaborate room. Whatever the exact date of its origin may be there is no gainsaying that it is a magnificent specimen of early craftsmanship, and as such we will consider it.

Sections of the panelled walls are illustrated, so that this article may be of practical value. These illustrations, being carefully drawn to scale, the designer or rodman may easily lay out his proportions. Readers will note that the walls are split up into pairs of double panels, divided by pilasters, these double panels themselves being flanked and divided by smaller pilasters. The author chose to illustrate the window recess for the reason that such a feature in a room is typical of the period, is pleasing, and often demanded by those who desire their houses decorated in this manner. Window recesses are always somewhat of a problem, and it is hoped that the suggestion given here will be of real value.

The characteristic bluntness of the era, just beginning to feel the refining influence of the Continental woodworkers, is well exemplified in the pilaster caps, the design being a broad interpretation of the classic Ionic capital. This same bluntness is to be observed in the cornice and the moulds throughout, which are illustrated in section with key letters indicating their positions on the elevations. The construction shown with these mouldings is modern, however, the author feeling that the original construction has no practical value to modern machine shops. The inlay, which is indicated, differs in design in almost every panel and is of bog oak and holly inset into the English oak, of which the whole is constructed. As it is unlikely that the manufacturer will be called upon to inlay a room so sumptuously as this one is done, just this passing reference will be given to that feature.

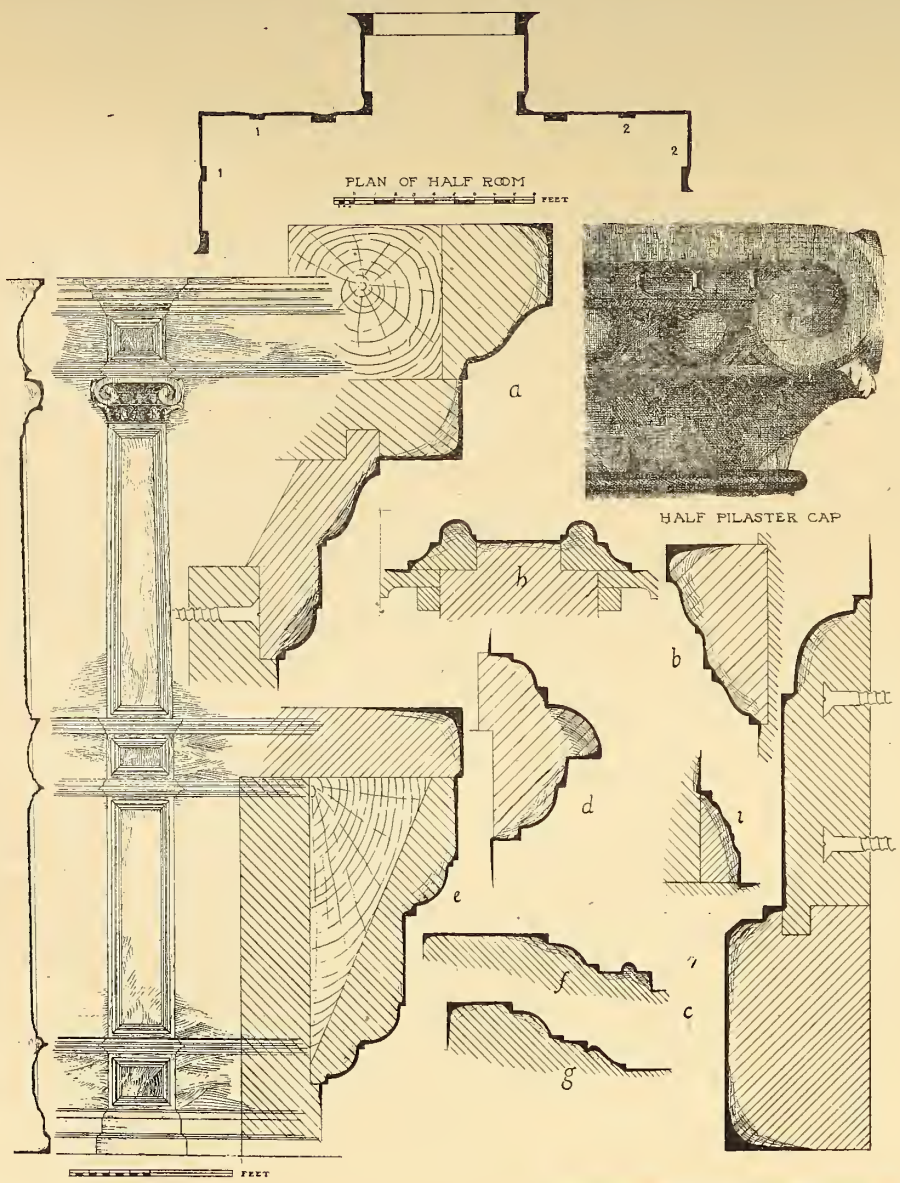
To those who lack experience of designing the problem of preserving the Jacobean characteristics as shown in this room and embodying them in a simplified version of the panelling might be difficult. In order to prepare for such a problem it is necessary to carefully analyze the various characteristics of proportion and detail here exemplified. Foremost is the peculiar spacing of the panels in pairs below the frieze with their semi-circular headings. This semi-circular heading is derived from Gothic influence, and while often found in woodwork of this period, may be dispensed with in a simpler rendering.

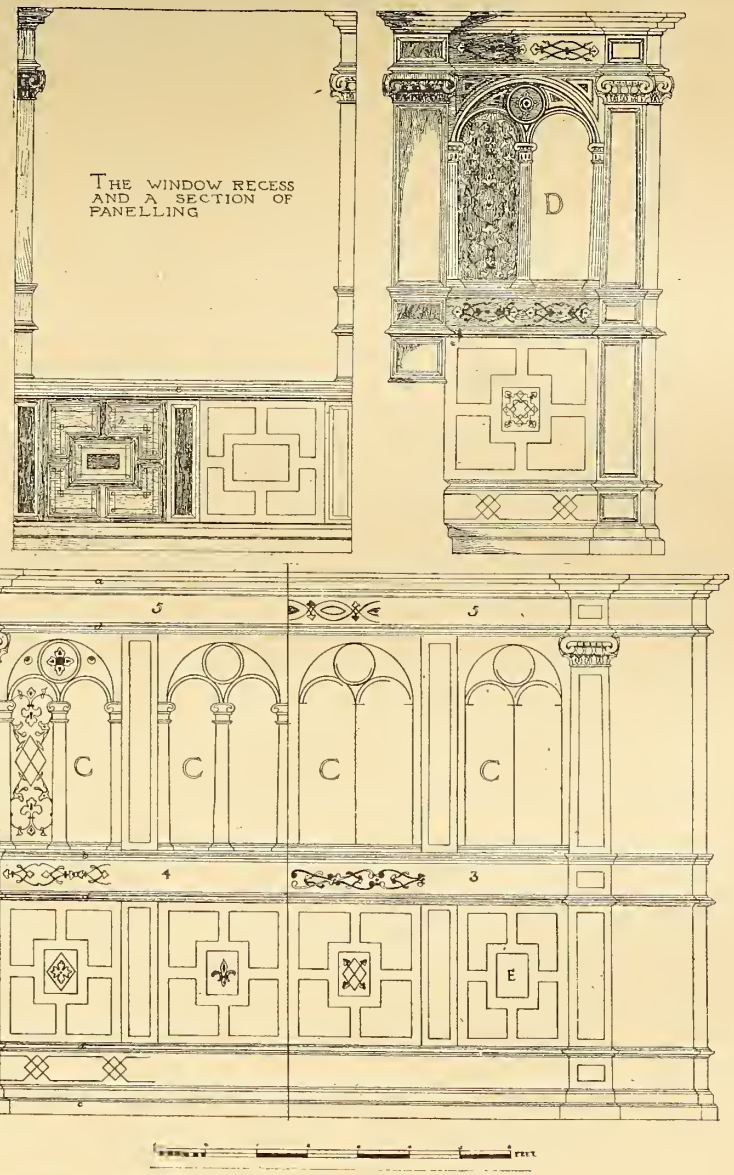
The arrangement of the panels below these, however, is typical and should be retained to preserve the spirit of the whole. It is also necessary to retain the panelled pilasters with the incidental mouldings, although here some simplification as to detail may be practised. The coarse cut carved capitals are an interesting and typical feature. The cornice moulding might well be used as it stands; so might the base board mould. In the case of the panel moulds, much of the detail could be dispensed with and good effect still retained; in fact where economy is advisable these may be dispensed with altogether. It is well to remember that the feeling behind the Jacobean woodwork is bluntness and honesty of craftsmanship. By bearing this in mind when designing in this style and by giving due study to the proportions as here detailed, the designer may well claim to have drafted that which is truly Jacobean in spirit.

The material for woodwork of this period is, of course, oak, which should be finished fumed to a rich brown color and waxed. Modern requirements may call for other material to be used, such as walnut, mahogany or even birch. Should either of these materials be used it would be necessary to refine the details somewhat so that it would be better suited to the finer woods.

A man to be successful and of benefit to his fellowmen should estimate his own worth and endeavor to raise his true value to that which he would have others place upon him. Then he will become a benefit to himself, to his customers, and to the community in which he lives.

Time makes money, either for the employer or those employed. Anything that inconveniences the workmen in the way of a lack of tools for the number of men employed should be speedily remedied, as this is unnecessary waste.





Illustrations of Jacobean panelling in South Kensington Museum.

Discussion on Handling of Veneer

By Lewis Taylor

The writer would like to emphasize a few points regarding the handling of first class rotary cut veneers for high grade work. The condition the veneers are in when the laying operation commences is just as important as the laying itself. Some firms have discarded the old-fashioned method of drying the veneers and straightening them between hot cauls and instead place the veneers in a caul box having a very high temperature. When this latter method is used the veneers become extremely brittle and require careful handling in order to avoid excessive wastage. Moreover, by this method the buckling of the veneer is not eliminated, which makes it more difficult to joint and match.

This matter has, I think, been dealt with in the "Canadian Woodworker" before to some extent, but the point I wish to bring out is this: Is there anything gained by adopting the quicker method of drying veneer in the caul box, or do we lose what is gained, owing to the difficulty of working the veneer; and again, what is the better way to lay veneer? Is it not better to dry the veneer out even between hot cauls and then lay it, than it is to lay it full of kinks and in the brittle condition the quick drying process leaves it in?

Veneer that is full of buckles is the kind that causes future trouble. It splits open when laying and this is just the time that it is difficult to make repairs owing to the necessity of getting the stock under pressure as quickly as possible. It is only by getting the veneer free from kinks that success is obtained in the laying operation. This is especially true of fancy walnut veneer, of which there are still considerable quantities used in piano and furniture factories.

A short time ago the writer picked up a piece of fancy circassian walnut veneer that had been "baked" in the caul box. It was full of kinks and down the centre, on the crest of the kink, was a ragged split. The veneer had been handled carelessly, no doubt but in its brittle and buckly condition it was almost impossible to handle it without breaking it. This was a concrete case of a good piece of veneer having been spoiled through not receiving the proper treatment.

If any firm is using the baking process of drying their veneers and are having trouble I would strongly urge that they give the "between hot cauls" method a trial. It may seem slower at first, but after all it is the final results that count. The wage bill for repairing split and broken veneers must be quite an item in a number of factories. This, I feel sure, could be lessened considerably by drying the veneer between hot cauls.

There is another point that I would like to call to the attention of readers of this journal. Nearly every factory using veneer picks out the dampest part of their premises to keep their veneer in. Now veneer should always be kept in a warm, dry place, because we should bear in mind that every foot of veneer is supposed to be future stock for the glue room. The storage room must not be too hot, however. There might be doubt about other pieces of stock being used in the glue room, but veneer is intended only to be glued on and therefore should be kept high and dry for that reason.

The more the writer sees and thinks of veneer troubles, the more he is convinced that those troubles can be almost entirely removed if proper care is taken of each log of veneer as it comes into the factory. In some factories logs of veneers have lain in a damp place for many years and have finally been brought out and used, with no great care taken to see that the veneer was perfectly dry before being laid. If veneer is properly dried and shrunk there should be no trouble, and if we give proper attention to this point it will repay us through the avoidance of checks that spoil so much of the finely figured veneer used on high grade work.

A good place to keep veneer is on top of the caul box. There is usually waste room there and it will get the warmth it should get besides being handy to get at when required.

Another point that I would like to place before veneer men is that in making butt joints care should be taken to avoid having the veneer full of tack holes. After jointing, put a tack here and there just to hold the veneer in place, then glue the tape on, using a warm caul the width of the tape and attach a hand screw at each end to hold the joint firmly until it is dry.

We cannot have too much discussion on the proper treatment of veneers because the success of much high class work depends upon the durability of the veneer work. By taking proper care of the veneer when it first arrives at the factory we help to ensure the dependability of the work.

Labor Saving Equipment in Panel Plant

By W. B. Axford

The following suggestions on the manufacturing of panels and built-up stock are contained in an address delivered before the National Veneer and Panel Manufacturers' Association at their recent meeting:

Whether you use vegetable glue, animal glue, casein, silicate, or a glue of your own make your mixers, rolls and the laying up of your panels require about the same labor. Your press, retainers, etc., require a certain number of men to operate them and it would probably be difficult to do away with any of these men. Your saving here must be by an equipment that will increase your output with the crew that you already have.

I have had considerable experience with curved work and I know that any great saving in this must be worked out in each mill and cannot be worked out in a general way.

I have also manufactured much flat stock, particularly three-ply box stock. This is the cheapest product in the form of panels and the aim is for quantity rather than quality, and every effort is made to get the greatest possible quantity of stock through the glue room with the ordinary crew.

My experience has been that this can be done with a hydraulic press and accumulator. The accumulator may be placed in the engine room along with the pump, where it may be looked after by the engineer. When it is released it acts immediately and saves the time required for a pump to elevate the press bed.

The ways of laying up and bolting up the stock are many. For fast work and a minimum of labor I prefer the press bed set flush with the floor, openings at the sides of the press and the openings set in line with the rolls as nearly as possible and as close to it as will be convenient.

The stock is laid up on one of the portable platforms, built with legs or blocks under the corners instead of the rail of 2 by 6-inch that is generally used on edge under the platforms. If the stock is of uni-

form size or within a certain range the platform may be used as the bottom caul, and the bottom retainers laid in place on the press bed before the platform is hauled into the press. If the stock varies greatly in size, the proper sized retainers and cauls may be placed in position on top of the platform. In either case the truck is used to haul the platform into the press so that two of the legs rest on the floor on each side of the press. The distance between the legs fore and aft of the platform is, of course, a little greater than the width of the press bed, so that the legs straddle it. The top retainers are put in place and when the power is applied the platform and all that is on it rises with the press bed, the pile is bolted up, the press released and the truck hauls the platform with the stock on it to where it can remain until time to be broken down. When the stock is to be broken down, the platform is hauled to place at the equalizing saw, after the top caul and retainers have been removed.

The panels are sawed both ways on this machine which has three saws on the mandril, two of which are on collars which may be removed along the mandril, in order to get both length and width of the panel, the middle saw making a cut for each dimension.

I have tried many kinds of retainers and have found the simplest to be the best. I use a rod with a head and cast washer on the bottom end and 12 inches of thread with a washer and the thumbnut on the other end.

The horizontals are made of two pieces of channel iron bolted or riveted together back to back with a washer between of a thickness a little greater than the diameter of the rod. The bolts or rivets are nine inches or a foot from the ends so that the backs of the two channels form a slot for the rods. With these simple rods I have used the 6 by 6-inch birch and maple blocks with the end slots sawed in them for the horizontals with good success. In breaking down with this arrangement the rods may be knocked out. I have found that the turnbuckle rods, wedge rods, etc., give more or less trouble in different ways. However many of them are in use and appear to give satisfaction.

Of the drying of the panels after they are glued and either before or after they are sized the same is true as of your single-ply stock. The quickest method and the cheapest is in a conveyor dryer. I have taken a basswood log from the water in the morning, cut it into veneer, dried it in the machine, glued it, sized the panels, dried them in the machine, crated and shipped them by express on a three o'clock train. It can be done in any mill that is properly equipped.

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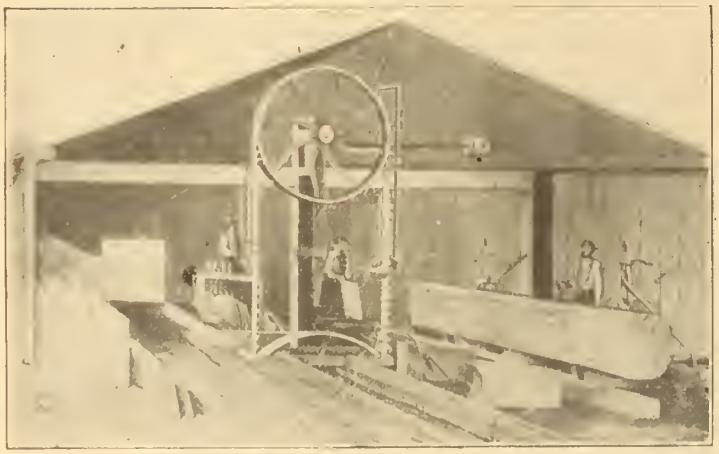

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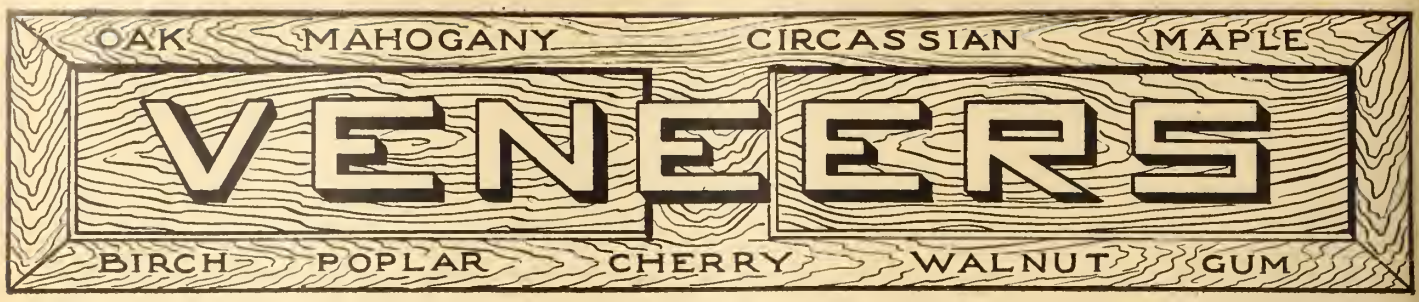

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The Lumber Market

Domestic Woods

The logging season in Northern Ontario is commencing and operators are going into the woods on quite an extensive scale. The general belief is that prices of lumber cannot fail to be higher next year but if the cut this winter is sufficiently large to make stocks more plentiful there should be some relief.

One of the biggest problems in connection with woods operations, of course, is the labor shortage. Just at present there is a fair supply of labor for mills located in towns, but those that are in outlying districts are having trouble, and naturally have to advance wages. Even then they are unable to maintain their crews at full strength. Once conscription is put in force the labor problem will no doubt be greatly enhanced.

Wholesale lumbermen state that business just at the present time is somewhat slack and that furniture factories and others are not placing many orders. This is undoubtedly owing to the season of the year. Furniture manufacturers have finished their summer lines and are preparing for their fall business, which gives promise of being good.

There is no great demand by the building trade for lumber. Local building is fairly active in some localities, but on the whole there is not much doing. Planing mills that cater to the building trades are in many cases working on other lines.

The shell box business is still decidedly active and is perhaps responsible for the greater portion of the lumber being used today. Large contracts were recently let for Bethlehem shell boxes, and while the Munitions Board made some concession on account of increased price of lumber, etc., in the minds of manufacturers the price is not yet adequate.

Stocks of British Columbia woods at Ontario points are low and prices high, this being the general situation in regard to all items on the lumber list.

The prices quoted at Toronto on hardwoods for carloads are as follows: White ash, firsts and seconds, 1½ and 2 in., $65 to $71; birch, firsts and seconds, inch, $55; basswood, firsts and seconds, inch, $53; soft elm firsts and seconds, inch, $48; rock elm, firsts and seconds, 1½ and 2 inch, $65; soft maple, firsts and seconds, inch, $48; hard maple, firsts and seconds, inch $47; Douglas fir, No. 1 and 2, 1 inch, clear, $50.75.

Imported Woods

The lumber situation in the United States is summed up in the following paragraphs from one of the American lumber trade journals, which will give Canadian manufacturers a line on the woods they import from the United States:

"As a rule the hardwood manufacturers of the middle south, as well as of the north, report a heavy demand for everything that they have in the shape of not only dry, but green, lumber. Wholesalers also are having a fair demand, but not in all cases as urgent as they would like to see. The building trade is so slack in the larger cities, that interior finish concerns are not particularly active and the demand for woods for interior work is not in the best demand. The expositions that were held last month in Chicago, Grand Rapids and other furniture centers started off in lively fashion, there being a large attendance of buyers and some good orders placed but after the first week the activity died away and very little interest was shown, so that there was much disappointment expressed on the part of the furniture people. In the way of agricultural implement stock and for purposes closely or remotely connected with the supply of war material, the demand is of extraordinary proportions and this in great measure counteracts the lack of business for building and furniture purposes.

"Northern manufacturers report that they are able to sell firsts and seconds inch red birch around $55 in the Chicago territory, and No. 1 common at from $40 to $45. No. 3 is now bringing from $19 to $21. Elm has fallen off in the demand lately, prices having declined something like $5 a thousand within the last few weeks. Basswood is firm and stocks are limited, quotations being made on inch firsts and seconds at $52, and on No. 1 common at $42. There has been a strong demand for maple in all grades, firsts and seconds 2-inch selling at from $65 to $70 and inch at from $48 to $50, while No. 1 common is ranging from $38 to $40. The demand for the flooring grade is strong.

"In the southern woods there is an improvement noted recently in oak, both white and red. Quotations on stock vary to some extent, ranging from $57 to $62 for inch firsts and seconds, Chicago delivery; $38 to $40 for No. 1 common; $27 to $30 for No. 2 common. The demand for red gum is heavy and prices are strong at from $48 to $49 for inch firsts and seconds; $38 to $39 for No. 1 common. Sap gum, firsts and seconds, is quoted around $36 and No. 1 common sap about $31.

"Lately there has arisen a good demand for willow, which is coming into the market for mouldings and similar purposes, some considerable sales having been made here lately of No. 1 common inch at from $33 to $35."

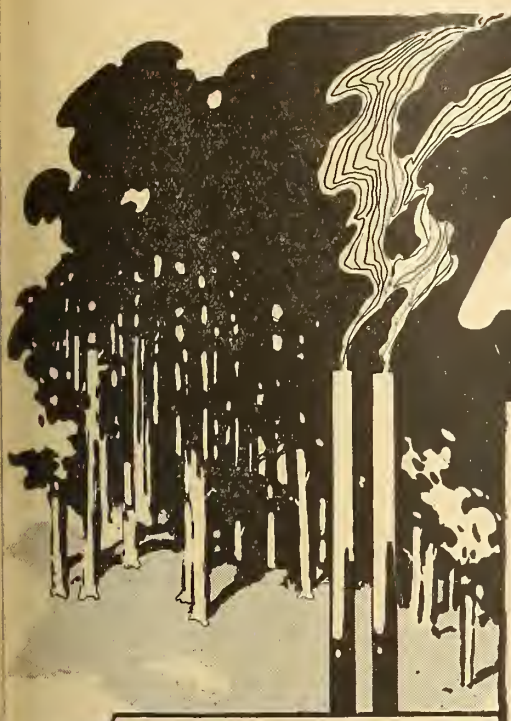
Leather Belting Specifications

There does not appear to be available any specifications for leather belting that are acceptable alike to the manufacturer and the user. While there are limits defined as regards belt width, they are lacking in variation in thicknesses, and it would seem desirable that the latter should be specified. One maintained to the writer that a variation of 10 per cent. is reasonable, another that 1/32 inch is a practical standard, while investigation shows that there is a variation much in excess of either.

A common expression used is, "Oak-tanned belt on being bent strongly by hand should show no cracks on the hair or grain side of the belt." I have met men who possess strength enough to crack almost any piece of belt by so bending. It would seem desirable to substitute some other test, such as bending over a suitable wooden block having a definite relation to the thickness of the belt tested. The tensile strength of the belt is not so important as the elasticity—the amount that a belt may be stretched and recover its original length—yet there are no statements covering this feature in any of the specifications I have examined.

That poor belting will be eliminated, where accurate records are kept, on account of its poor showing in economy goes without saying. A discussion of belt specifications should prove valuable for the guidance of all interested.—F. H. Williams, in "Power."

ATCO ABILITY



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Machine Bearings

Ask any factory engineer which part or parts of any machine gives him the most trouble to keep in order and see if he don't say the bearings every time, more especially if he is running a woodworking plant, with its high-speed tools and everything buzzing at from 2,000 to 8,000 revolutions per minute. It stands to reason it's a man's-size job to keep things in tune—scraping brasses, rebabbitting, taking up thrust, etc. It's no easy job to keep a crowd of machines up to concert pitch, especially in these times when overtime and night shifts are the order of the day, turning out munitions in some form or other in countless thousands. There are such things as ball bearings on the market to-day, which put an end to a lot of needless worry and hard work. I know many will shake their heads and say ball bearings may be all right for cycles, or a line shaft in a barber's shop, but they could never stand the racket in a woodworking shop. Still, there are quite as many who know that they can be used in woodworking machinery—yea, and are infinitely better adapted for high speeds than any other type of bearing.

Of course, there are numerous makes and types of ball bearings, as there are of other things, and in most cases the cheapest is not always the best. Thrust bearings may be used, with a single row of balls in many cases, but I should never think of using a high-speed radial race that did not have a double row of balls, or was not self-aligning and made to withstand axial thrust. Those are the points to consider and weigh up. 'Tis no use having ball races on a saw spindle, for instance, if you have to use steel collars to stop axial movement or end play. Get the right type for each job.

Above all things, see that your ball races are large enough for the work they have to do. Get them as large as you can get in your housings or castings. The larger the better. They don't take any more power, they cost very little extra, and last ever so much longer.

If you have already had ball bearings and had trouble with them, it's almost a certainty they were too small to take the load or were not fixed securely for thrust. One bearing, and one only, should be axial fixed on every job, whether it be a long length of line shafting or a short saw spindle; no collars used whatever. As to costs, I have always found ball bearings to be much cheaper than gun-metal. Even to convert an ordinary solid-bearing machine to take ball races is often much cheaper than to have new solid bearings made and fitted. Then you have advantages, both manifold and manifest. The wear is practically nil, even with excessive speeds and varying loads. If you keep out the grit and keep in the oil, you can then let a well-fitted ball race look after itself for a month at a time without oiling afresh. Almost every machine-builder of repute is building a few of his machines with ball bearings. Very soon it will be impossible to buy a new machine from any of the principal makers that is not fitted throughout with dust-proof ball bearings. Even then the factory engineer will not be allowed to sit idle in the engine-room. There will always be the old has-beens to patch, tinker, and repair.—J. M. N., in Timber and Woodworking Machinery.

Lumber Resources of the United States

"Backed by two thousand, eight hundred billion feet of standing timber, and an annual cut of some forty billion feet, there can be no question about the ability of the lumber industry to meet all demands upon it for the timber needed for the defence of the United States," declared R. S. Kellogg, secretary of the National Lumber Manufacturers' Association, before the annual world's salesmanship conference in Detroit recently. "The industry has the raw material, the machinery for conversion, and large supplies of the finished product ready for service. There is at least eight or ten billion feet of lumber already manufactured at the sawmills, and perhaps as much more in the many retail yards and distributing centers throughout the country. There is no other material used for construction purposes that combines in such a high degree the qualities of universal availability and workability. Wood can be had everywhere on short notice; it is transported on almost any kind of railroad equipment, subject to little damage en route, and can be used by all, chisel, saw, and plane quickly fitting it for a multitude of purposes. Weight for weight, wood is stronger than steel or any other material that may be substituted for it. Its durability is sufficient for all common uses, while by the selection of certain species or the chemical treatment of other species, it can be made to last indefinitely in locations favorable to decay. One of the most useful properties of wood is its non-conductivity of heat and electricity. Wood is one of the best insulating materials we have, which makes proper wood construction cool in summer and warm in winter. The world has built with wood from the beginning of time, and the return to the use of wood in the present national crisis is striking evidence of the serviceability of this universal material."

The Bennett Lumber Co. Limited

Solicit your enquiries for

Mahogany, Walnut, Oak, Poplar, Gum

and all other American HARDWOODS in all grades and thicknesses.

CANADIAN SPRUCE, PINE and BIRCH LUMBER

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Dry Hardwoods

4 cars 3/4 No. 1 Com. and Bet. Plain Red Oak.
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5 cars 4/4 No. 2 Common Plain Red Oak.
5 cars 4/4 F.A.S. Plain White Oak.
5 cars 4/4 No. 1 Common Plain White Oak.
5 cars 4/4 No. 2 Common Plain White Oak.
5 cars 6/4 No. 1 Com. and Bt. Plain White Oak.
5 cars 8/4 No. 1 Com. and Bt. Plain White Oak.
3 cars 8/4 No. 2 Common Plain White Oak.
2 cars 4/4 F.A.S. Quartered White Oak.
2 cars 4/4 No. 1 Common White Oak.
6 cars 6/4 F.A.S. White Oak.

We also have a fine stock of
Northern Hard Maple, Birch, Basswood, etc.

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Chicago Office:
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FOR SALE

2 cars 2x2 30 in. clear White Oak
2 cars 2x2 30 in. clear White Oak
2 cars 2½x2½ 30 in. clear Oak
3x3 30 in. clear Oak
1 car 2½x2½ 30 in. clear Oak
5 cars 2x2 20 in. clear Sap Gum
2 cars 2x2 30 in. clear Sap Gum
2 cars 2½x2½ 30 in. clear Sap Gum
1 car 3x3 30 in. clear Sap Gum
1 car 2x2 30 in. clear Sap Gum
2½x2½ 30 in. clear Sap Gum
3x3 30 in. clear Sap Gum

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Cincinnati, Ohio

Let Us Quote You

on these choice

Hardwoods

50 000 ft. 4/4 in. No. 3 Com. & Bet. Black Ash.
3,500 ft. 6/4 in. No. 1 Com. and Bet. Black Ash.
8,000 ft. 4/4, 5/4, 6/4 and 8/4 in. No. 2 Com. and Bet. White Ash.
45,000 ft. 4/4 in. No. 2 Com. and Btr. Winter Cut Basswood.
5,000 ft. 6/4 in. No. 1 Com. and Btr. Winter Cut Basswood.
14,000 ft. 4/4, 5/4 and 6/4 in. No. 2 Com. and Btr. Winter Cut Basswood.
60 per cent. 4/4 in., balance largely 5/4 in.
60,000 ft. 4/4 in. No. 3 Com. and Btr. Birch.
12,000 ft. 6/4 in. No. 1 Com. and Btr. Birch and Maple. (2/3 Birch, 1/3 Maple).
1 car 5/4 in. No. 2 Com. and Btr. Winter Cut. Hard Maple.
1 car 6/4 in. No. 2 Com. and Btr. Winter Cut Hard Maple.
2 cars 8/4 in. No. 2 Com. and Btr. Winter Cut Hard Maple.
(Not over 10% No. 2 Com. in last three items)
1 car 14/4 in. No. 1 Com. and Btr. Soft Maple.
3 cars 4/4 in. No. 3 Com. and Btr. Soft Elm.
2 cars 8/4 in. No. 1 Com. and Btr. Soft Elm.
1 car 12/4 in. No. 1 Com. and Btr. Soft Elm.

If you see what you want—write.

If you want something you don't see, write anyhow; we may have it.

Graves, Bigwood & Co.

Manufacturers
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PINE
HEMLOCK
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and
Deer Lake, Ont.

News of the Trade

The Standard Woodworking Company, Ltd., has been incorporated at Winnipeg.

The Maxwell Motor Company have started work on their new factory at Windsor, Ont.

A new firm in the talking machine business is the Victoria Talking Machine Company, Ltd., Winnipeg.

Work has been started on an addition to the Alaska Bedding Company's factory, Winnipeg. The estimated cost is $50,000.

The planing mill at Port Colborne, Ont., owned by Augustine & Son has been damaged by fire. The loss is estimated at $10,000.

The Stratford Manufacturing Company, of Stratford, Ont., have added folding card tables to their line. They are making these tables in several designs and finishes.

The William Lyall Shipbuilding Company, Ltd., has been incorporated, with head office at Montreal, to manufacture ships and maintain docks, etc. The capital of the company is $1,000,000.

The Ontario Woodworking Company, Ltd., has been incorporated at Kitchener, Ont. The company will manufacture a general line of woodenware. D. B. Betzner and E. B. Betzner, manufacturers, of Kitchener, are interested.

The Dominion Carriage Company, Ltd., a newly-incorporated company, will carry on operations at Montreal, P.Q. The capital stock is $500,000, and some of those interested are P. T. Legare, J. H. Fortier, and P. W. Fortier, all of Montreal.

P. Burt, an employee at the factory of W. J. Trick, Oshawa, Ont., had two fingers amputated recently. Some shavings were entangled in the cogs of one of the machines and he endeavored to remove them without stopping the machinery.

The Standard Doll, Toy, and Novelty Manufacturing Company has been incorporated at Montreal, with a capital of $20,000, to manufacture dolls, toys, novelties, etc. Some of those interested are L. W. Jacobs, B. Florin, Joseph Miller, and David Sommer, all of Montreal.

The Toronto Shipbuilding Company, Ltd., is building a plant in Toronto. They will build and equip all styles of vessels. They already have a contract for two ships. C. S. Boone and J. J. Manley, 17 Adelaide Street East, Toronto, are interested.

The Du Pont Fabrikoid Company have just completed their new half-million dollar factory at New Toronto, Ont. Manufacturing operations have been commenced, and about 100 skilled men will be employed when the plant is running to full capacity.

The basket factory operated by George Rivers, at Strathroy, Ont., has been totally destroyed by fire. The plant was running to full capacity in an effort to supply the fruit men of the district with baskets. About twenty employees are thrown out of work. The origin of the fire is unknown.

The plant of the North American Bent Chair Company at Owen Sound was damaged by fire recently. The blaze started in the finishing room and, owing to the inflammable nature of the contents, was difficult to fight. The fire-walls prevented the spread of the fire, and the sprinkler system proved effective in keeping it down.

The Lumber Products, Ltd., of New Westminster, B.C., has taken over the Iowa Lumber Company's plant at that place and will operate a sawmill, planing mill, box factory, and toy factory. The box factory will be the principal part of the new business. The toy factory to be established will be an extension of that now in operation in North Vancouver.

A new shipbuilding company has been incorporated under the name of the British-American Shipbuilding Company, Ltd., with head office at Toronto, Ont., and capital stock of $1,000,000. Among those interested are A. A. Kinghorn, Excelsior Life Building, Toronto, Ont., and F. H. Keefer, Thorold, Ont. The company will carry on general shipbuilding and contracting work.

The Hydraulic Machinery Company, Ltd., has acquired as a going concern the business and property of the Canadian Boomer and Boschert Press Company, Ltd., Montreal. The new company is fully equipped, and has an organization to render service in the design and construction of hydraulic machinery. They will continue to manufacture the full line of presses, pumps, accumulators, etc., as built by their predecessors.

Messrs. Playfair & Pratt, Midland, Ont., who purchased the plant of Benson & Bray, Ltd., last December, have formed a company and have been incorporated under the name of the Midland Wood Products, Ltd. The new company will continue the business as carried on by Playfair & Pratt, and have assumed their liabilities. The products of this plant are doors, sash, mouldings, flooring, and interior finish in pine and hardwoods.

The office of the British Columbia Lumber Commissioner at Toronto has been closed, presumably for the duration of the war. Mr. L. B. Beale, who was in charge of the office, has returned to Victoria, B.C. During the time he was in Toronto Mr. Beale made many friends in the woodworking trade ,and it is due largely to his untiring efforts that the forest products of British Columbia are so well known in Eastern Canada. We hope we will see Mr. Beale back in Toronto again before long.

Mr. John Olford Castle, of the firm of Castle & Son, furniture manufacturers and makers of shell boxes, died on July 24, in the Royal Victoria Hospital, Montreal. Mr. Castle was a designer of furniture and also manager of the firm's factory. Soon after the war the firm went into making shell boxes, and Mr. John Castle managed this part of the business. Mr. Castle was an occasional contributor to our columns, being especially interested in the prices paid for boxes, and their cost. A representative of the "Canadian Woodworker" discussed this question with him a few days prior to his death, Mr. Castle expressing the opinion that the Imperial Munitions Board were not paying sufficiently high prices to make the work remunerative. His death was rather sudden as he was ill for only a very short time.

Statistics of Packing Boxes

The United States Government has published statistics for 1914 dealing with the value of packing boxes manufactured in the United States, and comparing those made of wood with those of paper and fibre. The values of various kinds in 1914 were:

Wooden	$86,567,000
Cigar	8,337,000

The wooden packing boxes making the foregoing total included box shooks, trunk slabs, bottle boxes, crates for butter, fruit, berries, vegetables, egg cases, canned foods, boxes, carrier trays, and wine cases.

The wooden box industry has grown from a value of $1,100,000 in 1849 to $86,567,000 in 1914. During the same period the paper box industry grew from $434,000 to $74,711,000, and cigar boxes from $32,000 to $8,337,000.

—YOU progressive manufacturers who are anxious to increase production!

—YOU alert plant managers who are keen on perfecting your efficiency!

Do you buy your time by

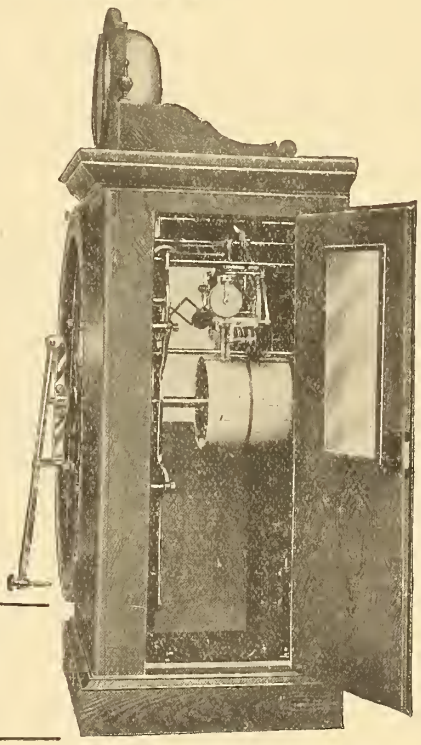
INTERNATIONAL?

Efficiency experts of national reputation have endorsed International Time Recorders because they KNOW they are vitally important and unerringly accurate.

The time you buy is just as important an item to the success of **your** business as the lumber you buy. Then why not **be sure** you get all the time you pay for?

And why not **be sure** the records of that time are accurate? Not by the inefficient, unsafe and unreliable pencil and time-book method—by the positive printed record. An "International" prints the time in plain legible type on records easily filed for reference.

Be fair to yourself and your business.



International Double Drum Daily Dial Recorder shown at right—one drum for yesterday's record—the other for to-day's. The "yesterday record" can thus be removed any time to-day without interfering with the current record. An invaluable method of securing daily distribution costs.
We have some new, very interesting folders to send you.

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Winnipeg Office
George Morris, 227 McDermott Ave.

VANCOUVER OFFICE—R. Donohoe, 305 Birk's Building

VISIT OUR EXHIBIT AT NATIONAL EXHIBITION

Code of Ethics

As adopted by the Commercial Rotary Gum Association, June 8, 1917:

"It is strongly urged that all details in regard to specifications, grades, part pieces, which dimension is length or with the grain, and which is width or across the grain, also price, terms and appropriate date of shipment be agreed upon before order is accepted.

"All orders should be in writing and signed by both parties or signed by buyer and accepted in writing by seller.

"If an order is taken verbally, by telephone or telegram, it should be confirmed in writing, as failure of the seller to confirm an order makes the order not binding upon the buyer.

"Any changes or alterations must be agreed to by both parties.

"All orders should be very explicit.

"All dimension stock should be cut length specified, and if buyer wishes an allowance, he should specify length required, and stock should be billed at actual length cut.

"All stock shall be of uniform and standard machine-gauge thickness.

"Stock of all grades must be cut solid, dried so that it will not mould or damage in transit, and sufficiently flat to straighten under the press without splitting.

"All specifications for special stock not covered by these rules shall be a matter of special contract between the buyer and the seller.

"Unless otherwise specified, all orders to be cut the sizes specified and to take, in addition, what part pieces the logs make. The part pieces to be cut as wide as they will make, and to be bundled or crated, each width separately in uniform quantities.

"Stock must be cut reasonably square.

"In cutting specified quantities, the mill must not run over 10 per cent. of amount specified, and where different sizes are used together the amount of different sizes must be shipped in the same proportion as ordered.

"All stock to be sold f.o.b. mill, with point of shipment specified, and if any allowance for freight the stock to be sold f.o.b. shipping point, with a specified freight allowance of so much per hundred pounds.

"All stock to be sold on a basis of thirty days net from date of invoice, and no discount whatever for cash or prepayment.

"The seller is not to be responsible for delays in securing cars or delays in transit.

"All orders subject to confirmation by the company.

"Orders for dimension stock not subject to cancellation unless seller fails to have ready for shipment when specified, and buyer must give seller ten days' notice to ship goods before order can be cancelled.

"Printed terms and conditions on order not binding on seller.

"No order binding on seller if the buyer's credit rating not good or buyer not in good standing."

It is not necessary to read your magazine if you are afraid of finding out something you didn't know.

It is no use putting a slovenly person on a good job and expect clean work as a result. It will never come.

Furniture Trimmings

Kitchen Cabinet Hardware, Casters

Our Assortment is Large

We Have Many New Designs for Your Consideration

Inquiries will receive prompt and careful attention

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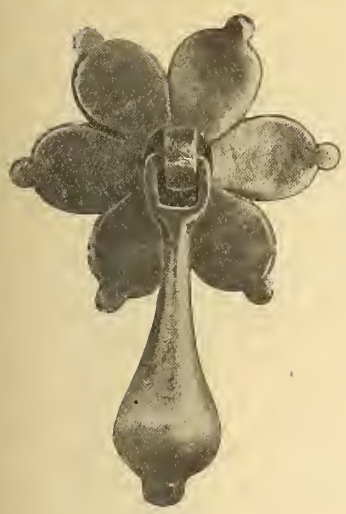

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Is distinguished for its finish

The original finish of the early English furniture, mellowed by age, is extremely beautiful. Not a little of this effect is due to the antique finish of the brass trimmings.

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Our Canadian representative is at your service.

FOSTER MERRIAM & CO. MERIDEN, CONN.

New York 225 Canal St. | Chicago 69 W. Lake St. | Grand Rapids Leonard Exhibition Bldg. | High Point, N.C. A. T. Wishart | Canadian Representative: F. A. Schmidt, Kitchener, Ontario

Lumber Wanted

1,000,000 feet 4/4 No. 2 Com. Birch, 5 in. and wider, 8 ft. and longer.

50 Carloads Birch, Beech or Hard Maple, cut 22¼ in. long and S2S to ¾ in.

Box 32, Canadian Woodworker, 345 Adelaide West, Toronto. 8-9

Utilizing the Waste

One of the serious wastes of saw and planing mills is the short lengths of lumber and narrow strips ripped from the edges of the larger material. It is customary to sell this for firewood, or burn it in refuse burners. This is only one side of the waste.

In practically all the cities and towns of Canada for some years manual training has been taught in the schools. Thus, thousands of former pupils, now with homes of their own, are more or less capable of following up the teaching of their youth by producing the numerous articles which help to give that homelike touch to homes, and which are useful as well as ornamental.

The manual training graduate has found, however, that his ambition to make things is seriously handicapped by the difficulty and cost of securing the necessary material. To obtain short pieces of different dimensions he must either buy the entire board of each size and have them delivered, or he must have the pieces cut to the sizes required and practically pay the price of the full length material.

This condition has discouraged the amateur cabinet-maker from applying his training. What would have developed into a hobby with many boys has been neglected, their instruction has been forgotten, the homes are bare of many novelties and much time which might be profitably employed is wasted.

Between the supply and the consumer of these short lengths of lumber is a gap which it is possible to bridge, and some means should be found by which the small pieces could be used and the consumer obtain them at a moderate price.

Checking and Air Seasoning

Checking is caused by unequal shrinkage. If the outside of a piece of wood dries considerably faster than the inside, the surface in time will contract until it can no longer extend around the comparatively wet interior, and so will be torn apart in checks. Checks often are classified as end checks and face checks. End checking or splitting during seasoning causes nearly as much loss as face checking.

Though the use of dry kilns is increasing steadily, the bulk of our wood is still seasoned in the open air. If kept in the air long enough, the moisture content of the wood finally comes into equilibrium with that of the surrounding atmosphere, and the wood is said to be air-dried. The rate of drying varies, of course, with time of year, species of wood, size and form of piece, and method of piling. Certain of these factors may be controlled or utilized in a way to hasten the drying process and lessen the likelihood of defects appearing in the material.

On Working Narrow Band Saws

Very narrow saws do not require to be tensioned to the same extent as wide saws. At the same time it is essential that the toothed edge should not be longer than the back, otherwise when strained on the pulleys the teeth would be slack and the saw would run and dodge in the cut. To lengthen the back the saw must be hammered by a series of light blows on both sides. The blows should fall at uniform distances, and close up to the back edge of the saw. A light, round-nosed hammer should be used, with the saw resting on the anvil. One row of blows will be sufficient for narrow saws, but two or more will be required for wider saws.

Twists and bends are removed by means of blows struck very lightly on the top of the ridge formed by the bend. When removing lumps, bends, or twists by means of a hammer the saw should rest on a block of hard wood placed endways on the grain, or, if the anvil is used, a stout piece of brown paper should be placed between it and the saw.—"Saws; Their Care and Treatment." H. Durham.

Great Britain Restricts Sales of Machinery

The Ministry of Munitions of Great Britain now requires issuance of permits to sell or enter into negotiations for sale of all machinery driven by power and suitable for use in cutting, working, or operating on wood, including sawing machines of all description, general joiners, mortise, tenon and boring machines, lathes and rounding machines, box and cask making machines, wheelright machinery, firewood making and bundling machinery, wood fiber and pulp machinery, saw sharpening and setting machines, saw stretcher, and brazing apparatus; all machines for grinding, planing, or molding iron. Applications for permits may be made to the Director of Wood Working Machinery, Charing Cross Buildings SW 2.

Surfacing Short Stuff

As this is an age which necessitates extreme economy in production, we would direct our readers' attention to the great saving which can often be effected in surfacing and jointing short stuff—crooked or otherwise—by the employment of an adjustable automatic feeding attachment. This can be readily fitted to most surfacing machines, and so arranged that it can be readily swung out of the way when not required, when the machine becomes an ordinary hand-jointer. With this attachment not only can about twice the amount of work be done, but it is of more even quality, and there is also immunity from accident to the workman. It is, in fact in many cases a very paying proposition.

WATCHMAN'S CLOCKS
Hardinge Portable
The only unlimited System.
Patrol clock, each $39.60 complete.
Stations, any number needed $4.10.
Also Key Type Clocks, limited capacity.
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PETRIE'S
MONTHLY LIST
of
NEW and USED
WOOD TOOLS
in stock for immediate delivery

Wood Planers
30" Whitney pattern surfacer.
26" double surfacer.
24" Single surfacers, various makes.
16" Canada Mach. Corp.
15" Woods planer and matcher.
12" Fisher, buzz.

Band Saws
54" McDonough horizontal.
42" Fay & Egan power feed rip.
28" Ballantine, bracket.
26" Crescent pedestal (2).
26" tilting table, pedestal.

Saw Tables
No. 3 Crescent, universal.
No 5 Crescent, sliding top.
Ballantine variable power feed.
No. 257 Berlin power-feed rip.
12' Defiance automatic equalizer.
MacGregor Gourlay railway cut-off.
Greenlee automatic cross-cut.
Canadian steel frame pole saw.

Mortisers
Cowan hollow chisel, M190.
Galt upright, compound table.
No. 5 New Britain, chain.
No. 2 Smart foot power.
No. 1 Smart foot power.

Moulders
13" Clark-Demill four-side.
12" Cowan four side.
12" Woods four-side.
10" Houston four side.
8" Dundas four-side.
6" Cowan four side.
6" Dundas sash sticker.

Sanders
24" Fay double drum.
12" C.M.C. disk and drum.
18" Crescent disk, disk and drum (2)

Clothespin Machinery
Humphrey No. 8 giant slab resaw.
Humphrey gang slitter.
Humphrey cylinder cutting-off machine.
Humphrey automatic lathes (6).
Humphrey double slotters (4).

Miscellaneous
Fay & Egan 12 spindle dovetailer.
MacGregor Gourlay 12 spindle dovetailer.
Cowan dowel machine, M80.
No. 1 Ballantine dowel machine.
Cowan post boring machine, M85G.
Crescent post boring machine.
Egan sash and door tenoner.
Dundas double-head tenon machine.
No. 4A Fox wood trimmer.
26" Dominion lath trimmer.
Defiance shovel handle shapers
48" 3 saw edger.
20" American wood scraper.
16" Ideal wood lathes (3).
4-head rounding machines.
Cowan spindle carver, M63.
No. 1 Hart automatic saw filer.
No. 104 Covel band-saw roller.

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H. W. PETRIE, LTD.
Front St. W., Toronto, Ont.

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Double "Perforator"

Tapes for your
CROSS Banding.

They give you the best

Possible Results

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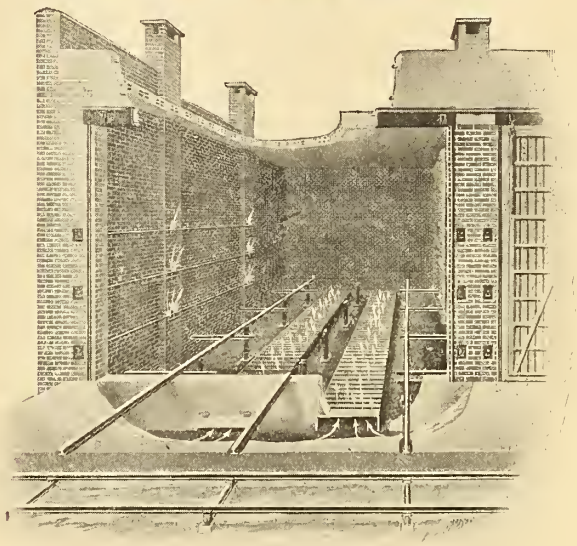
Keep a sample book of all our veneer tapes on file.

Ideal Coated Paper Co.

Veneer Tape Specialists

Mill and Office - BROOKFIELD, MASS.

Fifty-seven Kilns in Thirty-two Days Broke all Preceding National Sales Records



That was the record recently made by National salesmen. They are still at it.
NATIONAL Kilns are best and most reasonable in price.

Let us quote you.

THE NATIONAL DRY KILN CO.

1117 East Maryland St., INDIANAPOLIS, Indiana

Are Your Products Perkins Glued?

Ladies' Desk manufactured by The Jacques Furniture Co., Kitchener, Ont., in which Perkins Glue was used.

The live dealer realizes the value of selling his customers Perkins Glued products because they never come apart. Many of Canada's largest furniture factories use Perkins Vegetable Glue. It costs 20 per cent. less than hide glue, is applied cold, antiquating the obnoxious and wasteful cooking process, is absolutely uniform in quality and will not blister in sanding.

We will be glad to demonstrate in your own factory and on your own stock what can be accomplished with Perkins Vegetable Glue.

Write us today for more detailed information.

Perkins Glue Co.

Hamilton, Ont. **Limited**

Address all inquiries to Sales Office, Perkins Glue Company, South Bend, Indiana, U. S. A.

National Kilns in Michigan

An attractive folder which has just come to hand from the National Dry Kiln Company, of Indianapolis, contains a map of the State of Michigan, in the United States of America, showing at which points National kilns are installed. The map is appropriately named "A National Map," there being, according to the company, over one hundred National kilns in this state.

Some Questions to Ask Yourself

When you pass through your plant the next time let a note book accompany you. Then ask yourself the following questions:

(a) Are my employees co-operating to the extent I desire? If not, why not?

(b) How many valuable suggestions have I received from my men the past year?

(c) What proportion of force have been with me one, two, five or ten years? (A permanent organization is a result-getter).

(d) Are your men satisfied and contented?

(e) Are you properly studying and analyzing the elimination of waste in material, time and motion?

(f) Handling of material to machine and taking away?

(g) Method of piling?

(h) The machine itself, its speed and arrangement?

(i) Putting work in taking out of machine?

(j) What delays did you notice? Did you make a correction; if not, did you make a memorandum?

(k) Was there any inefficient conditions?

(l) Are you satisfied with percentage of orders shipped on or before date promised?

(m) What is being done with reference to training your men so as to make them efficient and desirous of remaining with you?

(n) Are facts as to manufacturing details in the hands of your men, or are they a matter of record, like your drawings?

(o) Do you study economy in time the same as you study the design of your product?

(p) Do you provide for investigation and betterment of unfair conditions?

(q) In reviewing would you classify your results as fair, good or excellent? If not excellent, why not?

Efficiency does not mean the installation of many forms, clerks in profusion, elaborate and complex systems. All this is rank inefficiency, and should be shunned by all interested in this modern movement.

A simple, workable system embodying in its scope all the principles and thoughts heretofore mentioned can be devised to fit the individual plant needs. Simplicity must always be the watchword. Don't close the spigot and let profit run out at the bung.

BILL OF MATERIAL

FOR ONE Ammunition Box

No	Kind	Rough Size	Name	No	Finished Size	Remarks	Sq. Ft.	
	Pine Spruce		Lid	1	½ x 4¼ x 2'-2"	Tongued & Grooved	.384	2
	"		"	1	½ x 6 x 2'-2"	Grooved & Planed	.542	3
	"		" Cleats	2	½ x 2¼ x 0'-9⅝		.752	4
	"		Bottom	1	½ x 4¼ x 2'-2"	Tongued & Grooved	.384	5
	"		"	1	½ x 6 x 2'-2"	Grooved & Planed	.542	6
	"		Sides	2	⅜ x 8¾ x 2'-1½"	Dadoed & Planed	1.355	7
	"		End Blocks	4	2⅞ x 3⅜ x 0'-8⅜	Planed	.476	8
	"		End Blocks Cleats	6	¾ x ½ x 0'-3⅝	Planed	.003	9
	Birch Maple Elm or Ash		Ends	2	⅝ x 8¾ x 0'-10"	Dadoed & Planed	.354	10
	Spruce Pine		Handle Cleats	2	¾ x 2¾ x 0'-5½		.079	11
	"		Bridges End-Top & Bottom	4	1¼ x 2½ x 0'-8⅞		.173	12
	"		Bridges End- Centre	2	1¼ x 4½ x 0'-8⅞		.36	13
	"		" Centre-Top & Bottom	2	2½ x 2½ x 0'-8⅞		.339	14
	"		" Centre- Centre	1	2½ x 4¼ x 0'-8⅞		.041	15
							6.343	16

ALL LUMBER MUST BE WELL SEASONED

Quantity		Name	
2	Pcs.	Steel ¾"x#20 Stubbs .036x2'-3-7/8" Bands - Order Mult Lengths	18
		Above item of Steel must conform to C.C. & F. Specification #43	19
2	Only	Gal. I. Wire Handles.Ends Hook-Jointed & Whipped with Strong Black	20
		waxed thread, & bound with waxed cord to make hand grip.	21
1/5	lb.	Dry Glue.	22
4	Only	Common Wire Nails 3½" - #9 - For End blocks together	23
12	"	" " " 1½" - #14 - For Cleats to lids	24
8	"	" " " 1½" - #16 - For Bottom to Sides & Ends.	25
18	"	Wire Finish " ¾" - #18 - For End Block Cleats.	26
18	"	Iron Wood Screws 1½" - #12 F.H.-For Bottom to Sides & Ends.	27
10	"	" " " 1½" - #12 F.H.-For Handle Cleats to Ends.	28
6	"	" " " 1" - #12 F.H. - For Lid to Sides.	29
18	"	" " " ½" - #8 F.H. - For Steel Bands to Sides & Bottom	30
			31

Stock bill used by the Canadian Car & Foundry Co., Montreal, for getting out shell boxes.

Dull-Polishing Woodwork

There are several methods of dull-polishing woodwork. The cheapest is to size and varnish the doors natural color. A better and more preservative method is to rub over the doors with white linseed oil, and varnish on this a few days later with any very pale varnish.

Then, again, the doors, etc., may be white polished in French polish. Nothing looks a better finish than this treatment if the woodwork is good, and it is not a costly method.

If French-polished work is constantly rubbed up with a little walnut oil sprinkled over a soft cloth it keeps in splendid condition; and the wood is well protected by the oiling, as a slight percentage of the oil penetrates the polish and wood and prevents perishing or impoverishment by dry heat, etc. If a dull finish is required, flatting varnish may be used over either of the varnished treatments.

If the work is French polished it may be dulled by slightly rubbing with a soft cloth sprinkled with flour pumicestone without the use of water. Oil may be used as a lubricant if desired.—Painters' and Decorators' Magazine.

Interested in Advertisements

"To me the most interesting part of the 'Canadian Woodworker' is the advertisements," said a manufacturer who makes high-class furniture. "This may appear singular, but it is true. I appreciate the fact that you have first-class articles by practical men; they are of value, especially those which describe new and more economical methods. A recent article on glue was of more than usual interest. Articles giving details of new machinery are of value to the man who is on the lookout for the latest developments in the woodworking industry. I always file the 'Canadian Woodworker,' and when I am in want of anything new turn to the advertising pages to see if what I require is advertised. I also look through them with the object of seeing if any new machinery of interest to me is being marketed."

Safety Cylinder Heads

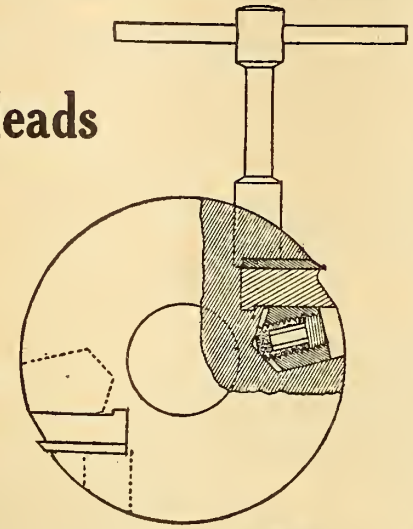
for

Jointers

and

Shapers

Two and Four Knife Heads

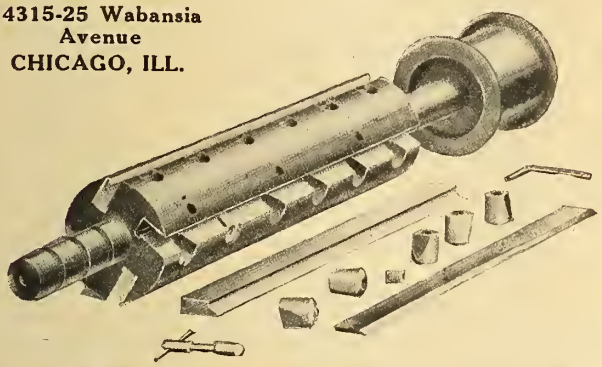


GUSTAFSON and SCOTT MFG. CO.

(Not incorporated)

4315-25 Wabansia Avenue

CHICAGO, ILL.



Woodworkers

and

Lumbermen

The Sheldon Exhaust Fans have characteristics that adapt themselves to the service of the Planing Mill or Wood-working Plant. They are specially designed for this kind of work, having a saving in power and speed of 25% to 40%.

Write for Industrial Booklet.

SHELDONS LIMITED - Galt, Ont.

Toronto Office, 609 Kent Building

— Agents —

Messrs. Ross & Greig, 412 St. James St., Montreal, Que.
Messrs. Walker's Limited, 259-261 Stanley St., Winnipeg, Man.
Messrs Gorman, Clancey & Grindley Ltd., Calgary and Edmonton, Alta.
Messrs. Robt. Hamilton & Co., Ltd., Bk. of Ottawa Bldg, Vancouver, B.C.

Give Carborundum Brand Garnet Paper and Cloth a Fair Chance and You Will Get Real Sanding Service at a Real Saving

THERE isn't any "sand" paper or cloth that can do good work if the work comes to the sander poorly planed.

¶ Nor will they give their best results if felts are badly worn, if the sander is "shaky," or if the speeds are wrong.

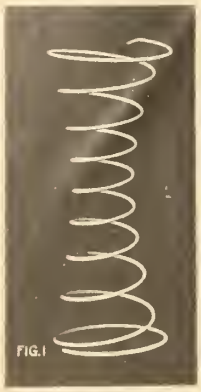
¶ Proper working conditions, good machines and Carborundum Brand Garnet Paper—and Cloth and you will get *real sanding service at a real saving*

Call on our Service Department any time.

The Carborundum Company

Niagara Falls, N. Y.

Grand Rapids New York Chicago Boston Philadelphia Pittsburgh Cleveland Milwaukee Cincinnati



HIGH GRADE SPRINGS

for all kinds of Upholstery Work

Constructions for Chairs, Davenports, Carriages and Automobiles.

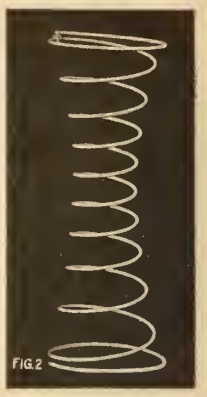
"Fosters" Multi-Springs and Luxury Springs

Spring Filling for Top Cushions

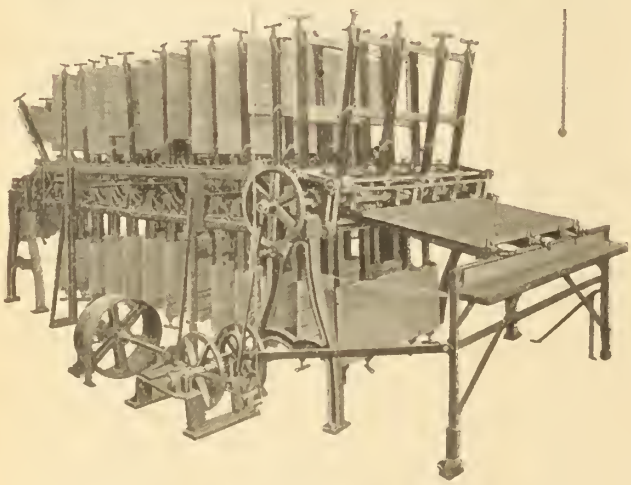
The service resulting from 30 years' experience is at your command.

We solicit your inquiries and an opportunity to submit samples.

FOSTER BROS. MFG. CO., Utica, N.Y., U.S.A.



Do You Handle Glued-up Stock?



If you do, here is a machine that will save you 60% of the time and labor required to handle your work with hand clamps. This machine is the Billstrom Automatic Glue Clamp Carrier.

EXAMINE THE ILLUSTRATION

Nels J. Billstrom, 2002 Ninth Street, ROCKFORD, ILL.

R. S. Pollard, Preston, Ont.

Cut the Cost of Production

by using the

WAYMOTH VARIETY WOOD-TURNING LATHE

Every feature incorporated in the lathe which makes for a little saving in the time of the operator, every item for his convenience that enables him to do better and more rapid work, assures just that much better service to the owner.

We would like to tell you about three special features of this lathe.

Our lathes are sold in Canada by

A. R. Williams Machinery Co., Toronto, Vancouver and Winnipeg.
General Supply Company of Canada, Ottawa.
Williams & Wilson, Montreal.

A. D. WAYMOTH & CO., FITCHBURG, MASS.

Established in 1845.

DARLINGS STEAM APPLIANCES

DARLING BROTHERS
LIMITED
Engineers and Manufacturers
MONTREAL, CANADA

Branches: Toronto and Winnipeg. Agents: Halifax, St. John, Calgary, Vancouver.

PRESSES

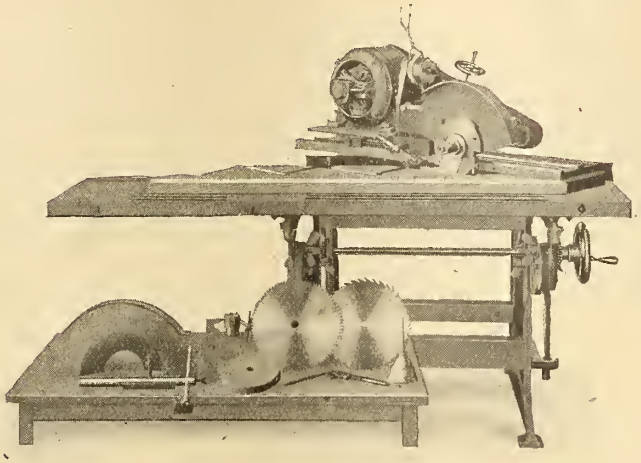
For Veneer and Veneer Drying

Made in Canada

William R. Perrin

Limited

Toronto



Pat. 1912 and 1914—Other Patents Pending

Elliot Woodworker No. 5

We take great pleasure in introducing our No. 5 Woodworker. Our aim has been to put out the best combination Woodworker on the market—our sales prove it. We have sold over 450 machines in Detroit and Toronto alone, besides hundreds in other places from Juneau, Alaska, to Johannesburg, South Africa.

A few of our recent sales are—three to the Norfolk Navy Yards, one to the Brooklyn Navy Yard, one to the Newport Navy Yard, to the West Point Military Academy, the Provincial Board of Health, Norcross Bros., Montreal, and others.

Our No. 5 Machine has an iron top, double bevel geared, raising device, and the jointer is lowered so the slide and carriage clears the jointer fence when swung around for cross-cutting, etc. It will rip 5" thick and joint at the same time. It cuts joist, foot, plumb and side cuts of jackrafters, studding, door and window-frames, concrete form work, trim, etc. Pattern makers, wagon makers and cabinet makers are finding this machine a great money-saver.

WRITE FOR OUR NEW PRICES AND TERMS TO

Elliot Woodworker, Limited

Office and Factory: College and Bathurst Streets

TORONTO

Phone College 1496

You Have Paid for an Installation of

Chapman Double Ball Bearings

in Your Factory over and over again, BUT—

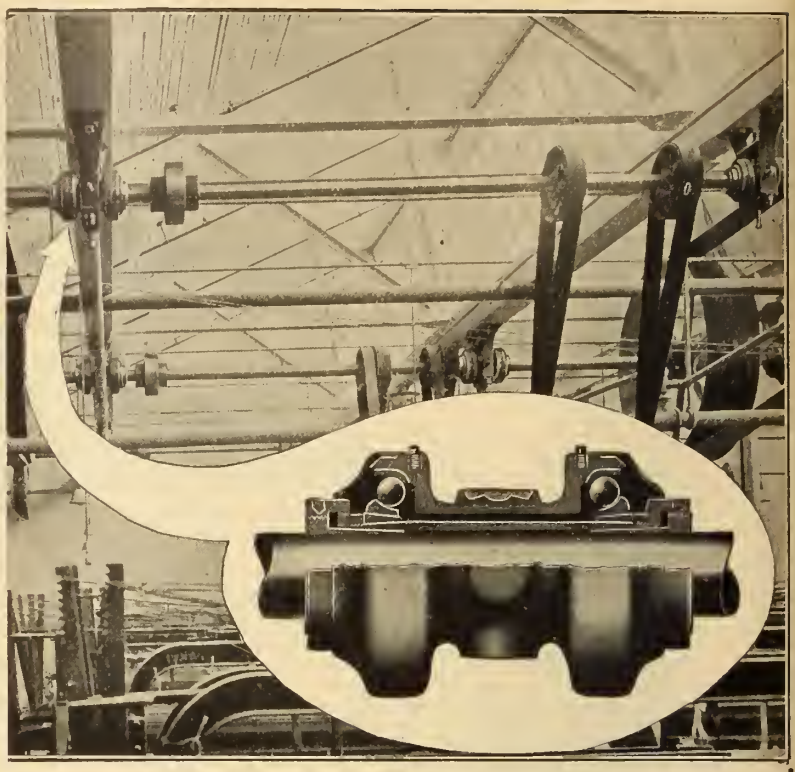
HAVE YOU GOT THEM ?

Ordinary line shafting wastes from 15 per cent. to 60 per cent. of power.

Line shafting equipped with Chapman Double Ball Bearings will eliminate about 75 per cent. of the friction, thus averaging a total saving of from 15 per cent. to 30 per cent.

Chapman Double Ball Bearings fit any adjustable hanger and require oiling and attention only once a year. No extra equipment required to install.

Write to-day for full particulars.



The Chapman Double Ball Bearing Co. of Canada, Limited

Toronto 339-351 Sorauren Ave. Ontario

American Branch: The Transmission Ball Bearing Co., Inc., 32 Wells St., Buffalo, N. Y.

BOX MACHINERY

The high cost of box lumber, materials, labor, etc., makes it necessary to get a maximum capacity out of your factory at a minimum cost for production.

Are you interested in

Increasing Factory Efficiency?
Lowering Labor Costs?
Turning Out Higher Grade Work?

Then you will want a copy of Mereen-Johnson's latest catalog showing many Automatic Labor Saving Machines

"Machines that cut your costs"

Including

AUTOMATIC BOX BOARD SQUEEZERS, HOPPER FEED BOX BOARD RESAWS, VERTICAL RESAWS, BOX BOARD MATCHERS, BOTTLE BOX GROOVERS, HAND HOLD AND RECESSING MACHINES, GANG CLEAT SAWS, TRIMMERS AND EQUALIZERS, CUTOFF AND RIP SAW TABLES, ETC., ETC.

The most complete Line of Box Machines on the market

Write for complete catalog.

MEREEN JOHNSON MACHINE COMPANY

MINNEAPOLIS MINN., U. S. A.

FROST KING *"The Standard for Forty Years"* TROJAN

The Dependable Babbitt

Equally as good for heavy duty as speed. It is especially adapted for manufacturers of woodworking machinery, planing mills, furniture factories, box factories and woodworking plants.

Try it

Our High Grade Babbitt

Owing to its phenomenal ability to absorb oil "Trojan" babbitt will be found ideal for overhead bearings in line and counter-shafts as it is unnecessary to oil as often as with the ordinary babbitts.

Try it

HOYT METAL COMPANY - Toronto, Ont.

NEW YORK ST. LOUIS LONDON, ENG.

Morehead

~~Back to Boiler~~

SYSTEM

PRACTICAL POINTERS ON BOILER ROOM EFFICIENCY

IN THE NEW "Morehead" book you will find real ready-to-use information on the handling of your steam equipment which may save you thousands of dollars a year.

Besides a general discussion on the drainage of kilns and steam heated machinery generally, there are interesting

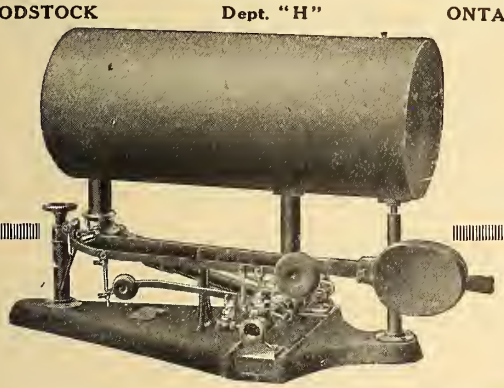
PICTURES AND DATA

which will show you how representative plants everywhere are turning their condensation into golden profit.

Write for the book today.

CANADIAN MOREHEAD MFG. CO.

WOODSTOCK Dept. "H" ONTARIO



GRAND RAPIDS VAPOR DRY KILN

GRAND RAPIDS MICHIGAN

Increasing output of other kilns is part of our business.

We can arrange to utilize your present equipment and supplement with sufficient additional to bring your kilns to our basis of output.

We would suggest that you supply our engineering department with description of your kilns and lumber drying needs, so we can understandingly outline what can be done.

Your opening the matter will incur no obligation and we will give you, frankly, the results of our experience.

BOOKS FOR SALE

The following books are offered at special prices subject to previous sale:

Cabinet Making, by J. H. Rudd. Published by Grand Rapids Furniture Record Company. 210 pages, illustrated. Price $1.50.

Saw Fitting Manual, a treatise on the care of saws and knives. Deals with everything in the saw and knife alphabet, from adjustments to widths. 144 pages. Price $2.00.

Common-sense Handrailing, by Fred T. Hodgson. Published by Frederick J. Drake & Company, Chicago. 114 pages, illustrated. Price 50c.

Roof Framing Made Easy, by Owen B. Maginnis. Published by The Industrial Publication Company, New York. 164 pages, illustrated. Price 50c.

"Carpentry," by Ira S. Griffith. Published in 1916 by The Manual Arts Press. 188 pages, illustrated. Price $1 00.

Handrailing Simplified, by An Experienced Architect. Published by William T. Comstock, New York. 52 pages, illustrated. Price 50c.

How to Join Mouldings; or, The Arts of Mitering and Coping, by Owen B. Maginnis. Published by William T. Comstock, New York. 72 pages, illustrated. Price 50c.

Utilization of Wood-Waste (Second Revised Edition), by Ernst Hubbard. Published in 1915 by Scott, Greenwood & Sons. 192 pages, illustrated. Price $1.50.

Woodworker Publishing Company, Limited

345 Adelaide Street West, Toronto, Ontario

The "Canadian Woodworker" Buyers' Directory

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Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
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Yates Machine Co., P. B., Hamilton, Ont.

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Toy Products Co. of Canada, Farm Point, Que.

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DUST SEPARATORS
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Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Simonds Canada Saw Co., Montreal, Que.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
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Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

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Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

FLUTING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.

FLUTING AND TWIST MACHINE
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Decorators Supply Co., Chicago, Ill.

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Yates Machine Co., P. B., Hamilton, Ont.

The Babbitt Metal that's at the Front in Efficiency and Economy

HARRIS HEAVY PRESSURE

"The Babbitt Metal Without a Fault" is guaranteed to give EXCELLENT SERVICE. It will not crack or squeeze out. It will run cool at any speed. It is copper coated and copper hardened. It is best for all general machinery bearings. Order a box from our nearest factory.

It is Made in Canada. What We Make We Guarantee.

We Manufacture All Grades of Babbitt Metals.

WRITE FOR COMPLETE LIST

THE CANADA METAL COMPANY, LIMITED

Head office and Factory TORONTO Fraser Avenue

Branch Factories:— HAMILTON MONTREAL WINNIPEG VANCOUVER

The Reynolds Pattern & Machine Co.

Announces

the discontinuance of operations at Moline, Illinois, to occur about August 1st, 1917, and the

Removal

of the business entire, together with the management, to

Massillon, Ohio

where the business will be continued under the name of

The Reynolds Machine Manufacturing Company

We thank you for the many favors shown us, and solicit your patronage and courtesies for the new company.

Reynolds Pattern & Machine Co.

G. D. Reynolds, Pres. and Gen'l Mgr.

"Canadian Woodworker" Buyers' Directory—Continued

GLUE
Perkins Glue Company, South Bend, Ind.

GLUE CLAMPS
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Neilson & Company, J. L., Winnipeg.

GLUE HEATERS
Fay & Egan Co., J. A., Cincinnati, Ohio.
International Electric Co., Indianapolis, Ind.
Jackson, Cochrane & Company, Kitchener, Ont.

GLUE JOINTERS
Canada Machinery Corporation, Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Yates Machine Co., P. B., Hamilton, Ont

GLUE SPREADERS
Fay & Egan Co., J. A., Cincinnati, Ohio
Jackson, Cochrane & Company, Kitchener, Ont.

GLUE ROOM EQUIPMENT
Billstrom, Nels. J., Rockford, Ill.
Perrin & Company, W. R., Toronto, Ont.

GRAVITY CARRIERS
Canadian Mathews Gravity Carrier Co.

GRINDERS (Cutter)
Fay & Egan Co., J. A., Cincinnati, Ohio
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.

GRINDERS, HAND AND FOOT POWER
The Carborundum Co., Niagara Falls, N.Y.

GRINDERS (Knife)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

GRINDERS (Tool)
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Kitchener, Ont.

GRINDING WHEELS
The Carborundum Co., Niagara Falls, N.Y.

GROOVING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Mattison Machine Works, C., Beloit, Wis.

GUARDS
Gustafson & Scott Mfg. Co., Chicago, Ill.

GUM LUMBER
Anderson-Tully Co., Memphis, Tenn.
Brown & Co., George C., Memphis, Tenn.
Churchill-Milton Lumber Co., Louisville, Ky.
Thomas & Proetz Lumber Co., St. Louis, Mo.

GUMMERS, ETC.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Machinery Co. of America, Grand Rapids, Mich.

HAND PROTECTORS
Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND SCREWS
Fay & Egan Co., J. A., Cincinnati, Ohio.

HANDLE & SPOKE MACHINERY
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Whitney & Son, Baxter D., Winchendon, Mass.

HARDWARE
Acme Stamping & Tool Works, Hamilton, Ont.
Burns & Bassick Co., Bridgeport, Conn.
Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.
Laidlaw Bale-Tie Co., Hamilton, Ont.
Vokes Hardware Co., Toronto.
Weber-Knapp Co., Jamestown, N.Y.

HARDWOOD LUMBER
American Hardwood Lumber Co., St. Louis, Mo.
American Oak Mfrs.' Assn., Memphis, Tenn.
Anderson-Tully Co., Memphis, Tenn.
Atlantic Lumber Company, Toronto.
Banning, Leland G., Cincinnati, Ohio.
Brown & Company, Geo. C., Memphis, Tenn.
Burns & Knapp Lumber Co., Conneautville, Pa.
Churchill-Milton Lumber Co., Louisville, Ky.
Clark & Son, Edward, Toronto, Ont.
Dermott Land & Lumber Co., Chicago, Ill.
Graves, Bigwood Company, Toronto, Ont.
Kersley, Geo., Montreal, Que.
Korn-Conkling Co., Cincinnati, Ohio.
Martin-Barriss Co., Cleveland, Ohio.
Paepcke Leicht Lumber Co., Chicago, Ill.
Payson Smith Lumber Co., Minneapolis, Minn.
Pickrel Walnut Co., St. Louis, Mo.
Probst Lumber Co., Cincinnati, Ohio.
Read Bros., Limited, Toronto.
Spencer, C. A., Montreal, Que.

HUB MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
Perrin & Company, Wm. R., Toronto, Ont.

JOINTERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

KNIVES (Planer and others)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

LATHES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Defiance Machine Works.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.

LUMBER
Aberdeen Lumber Co., Pittsburg, Pa.
Acme Veneer & Lumber Co., Cincinnati, Ohio.
American Hardwood Lumber Co., St. Louis, Mo.
Anderson-Tully Co., Memphis, Tenn.
Banning, Leland G., Cincinnati, Ohio.
Barr-Holaday Lumber Co., Greenfield, Ohio.
Brown & Company, Geo. C., Memphis, Tenn.
Churchill, Milton Lumber Co., Louisville, Ky.
Clark & Son, Edward, Toronto, Ont.
Dermott Land & Lumber Co., Chicago, Ill.
Gillies Bros., Braeside, Ont.
Graves, Bigwood Company, Toronto, Ont.
Hartzell, Geo. W., Piqua, Ohio.
Huddleston, Marsh Mahogany Co., New York.
Korn-Conkling Company, Cincinnati, Ohio.
Long-Knight Lumber Co., Indianapolis.
Paepcke Leicht Lumber Company, Chicago, Ill.
Pauze, Wilfrid H., Montreal, Que.
Payson Smith Lumber Co., Minneapolis, Minn.
Pickrel Walnut Co., St. Louis, Mo.
Probst Lumber Co., Cincinnati, Ohio.
Read Bros., Limited, Toronto.
Shreiner Lumber Co., Pittsburgh, Pa.

MACHINE KNIVES
Canada Machinery Corporation, Galt, Ont.
Peter Hay Knife Company, Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

MITRE MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

MITRE SAWS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Simonds Canada Saw Co., Montreal, P.Q.

MULTIPLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Reynolds Pattern & Machine Co., Moline, Ill.

PANELS
Waetjen & Co., George L., Milwaukee, Wis.

PATTERN SHOP MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PERIOD MOULDINGS
Waddell Mfg. Co., Grand Rapids, Mich.

PLANERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Wallace & Company, Chicago, Ill.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PLANING MILL MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PRESSES (Veneer)
Canada Machinery Corporation, Galt, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Perrin & Co., Wm. R., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.

PULLEYS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Machinery Co. of America, Grand Rapids, Mich.

RED GUM LUMBER
Gum Lumber Manufacturers' Association.

RECORDERS (TIME)
International Time Recording Co., Toronto, Ont.
Signal Systems, Limited, Toronto, Ont.

RESAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

RIM AND FELLOE MACHINERY
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.

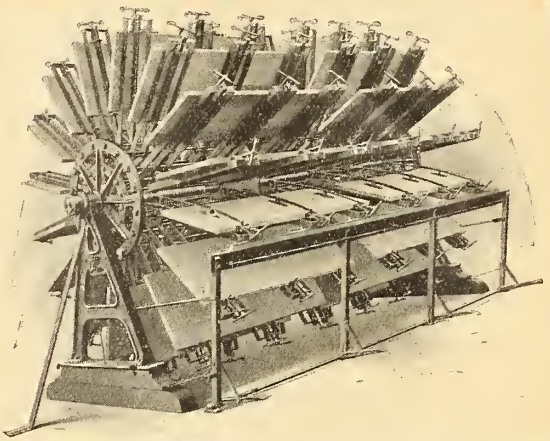
RIP SAWING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Sinker-Davis Company, Indianapolis, Ind.
Yates Machine Co., P. B., Hamilton, Ont.

Palmer's Perpetual Revolving Clamp

is the most practical, durable and rapid device for the clamping of edge joints and will show you a great saving in time, floor space and labor.

WRITE FOR FULL PARTICULARS TO

ALBERT E. PALMER & SONS
Owosso, Mich., U. S. A.



RADCLIFF CYLINDER SAWS
FOR SHELL BOXES

The illustration shows the special taper cutter used for the Nose blocks of the 4.5 in. and Bethlehem Boxes. These cutters will do quick smooth work and cut hole through and taper sides all in one operation. The kicker will eject the core. The shank can be made to fit any chuck over ¾ in. diameter, but we prefer to make them to fit over end of boring machine spindle where possible. Extra knives can be supplied to renew worn ones.

Get our prices.

RADCLIFF SAW MFG. CO., LIMITED
Agents for L. & I. J. White Co., Machine Knives

550 DUNDAS ST.
TORONTO, ONT.

"DOT EMBOSSED"
300 Foot Coil

Patent Coil Holder

STEEL BOX STRAPPING

SMOOTH EDGES—CONTINUOUS LENGTHS
COIL HOLDERS SUPPLIED
LACQUERED—GALVANIZED——BRIGHT

Write now for Catalog.

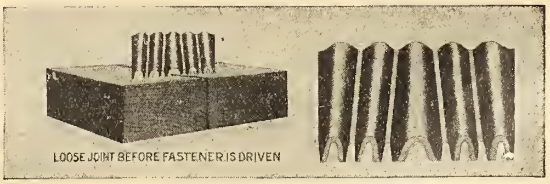
ACME STEEL GOODS CO.
OF CANADA, LIMITED
20 St. Nicholas St. MONTREAL, Que.

Corrugated Joint Fasteners

In bulk in Barrels and Boxes.

In coils for Automatic Driving Machines.

PARALLEL SAW EDGE



DIVERGENT SAW EDGE

"Canadian Woodworker" Buyers' Directory—Continued

SAFETY DEVICES
Gustafson & Scott Mfg. Co., Chicago, Ill.

SANDERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Nash, J. M., Milwaukee, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SASH, DOOR & BLIND MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SAWS
Atkins & Co., E. C., Indianapolis, Ind.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Radcliff Saw Mfg. Company, Toronto, Ont.
Shurly-Dietrich, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Smith Co., Ltd., R. H., St. Catharines, Ont.

SAW GUMMERS, ALOXITE
The Carborundum Co., Niagara Falls, N.Y.

SAW SWAGES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Machinery Co. of America, Grand Rapids, Mich.
Radcliff Saw Mfg. Co., Toronto, Ont.
Simonds Canada Saw Co., Montreal, Que.

SAW TABLES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SCRAPING MACHINES
Canada Machinery Corporation, Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass.

SCREW DRIVING MACHINERY
Canada Machinery Corporation, Galt, Ont.
Reynolds Pattern & Machine Works, Moline, Ill.

SCROLL SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

SECOND-HAND MACHINERY
Cowan & Co., Galt, Ont.
Petrie, H. W.
Wayne Machinery Co., Fort Wayne, Ind.

SHAPERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Whitney & Sons, Baxter D., Winchendon, Mass
Yates Machine Co., P. B., Hamilton, Ont.

SHARPENING TOOLS
The Carborundum Co., Niagara Falls, N.Y.

SHAVING COLLECTORS
Sheldons Limited, Galt, Ont.

SHOOK BUNDLER
Neilson & Company, J. L. Winnipeg, Man.

SPRINGS FOR UPHOLSTERY
Foster Bros. Mfg. Co., Utica, N.Y.

STAINS
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.
Schmidt, Walter K., Grand Rapids, Mich.

STEAM APPLIANCES
Darling Bros., Montreal.
Morrison Brass Mfg. Co., Toronto, Ont.

SINGLE SPINDLE BOXING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

STAVE SAWING MACHINE
Whitney & Sons, Baxter D., Winchendon, Mass.

STEAM TRAPS
Canadian Morehead Mfg. Co., Woodstock, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

STEEL BOX STRAPPING
Acme Steel Goods Co. of Canada, Ltd.

STEEL SHELL BOX BANDS
Acme Steel Goods Co. of Canada, Ltd.

SURFACERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

SWING SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Yates Machine Co., P. B., Hamilton, Ont.

TABLE LEG LATHES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Mattison Machine Works, C., Beloit, Wis.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

TABLE SLIDES
Walter & Co., B., Wabash, Ind.

TENONING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

TRANSMISSION MACHINERY
Dodge Mfg. Co., Ltd., Toronto, Ont.

TELEPHONES—PRIVATE SYSTEMS
Signal Systems, Limited, Toronto, Ont.

TRIMMERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

TRUCKS
Gray-Dort Motors, Chatham, Ont.
Sheldons Limited, Galt, Ont.
National Dry Kiln Co., Indianapolis, Ind.

TURNING MACHINES
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Mattison Machine Works, C., Beloit, Wis.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

UNDER-CUT SELF-FEEDING FACE PLANER
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

VARNISHES
Ault & Wiborg Company, Toronto, Ont.

VARNISH SPRAYERS
DeVilbiss Mfg. Co., Toledo, Ohio.

VENEERS
Acme Veneer & Lumber Co., Cincinnati, Ohio.
Barnaby, Chas. A., Greencastle, Ind.
Central Veneer Co., Huntington, W. Virginia.
Clark Veneer Co., Walter, Grand Rapids, Mich.
Empire Veneer Company, Chicago, Ill.
Hartzell, Geo. W., Piqua, Ohio.
Hoffman Bros. Company, Fort Wayne, Ind.
Geo. Kersley, Montreal, Que.
Nartzik, J. J., Chicago, Ill.
Ohio Veneer Company, Cincinnati, Ohio.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Roberts Veneer Co., New Albany, Ind.
Toronto Veneer Company, Toronto, Ont.
Waetjen & Co., George L., Milwaukee, Wis.

VENEER TAPE
Ideal Coated Paper Co., Brookfield, Mass.

VENTILATING APPARATUS
Sheldons Limited, Galt, Ont.

VENEER JOINTERS
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.

VENEER PRESSES (Hand and Power)
Canada Machinery Corporation, Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Perrin & Company, Wm. R., Toronto, Ont.

VISES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Company, Montreal, Que.

WAGON AND CARRIAGE MACHINERY
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

WATCHMAN'S CLOCKS
Signal Systems, Limited, Toronto, Ont.

WOOD FINISHES
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

WOOD PRINTING PRESSES
Hooper Co., F. X., Glenarm, Md.

WOOD PULLEYS
Dodge Mfg. Co., Ltd., Toronto, Ont.

WOOD TURNING MACHINERY
Canada Machinery Corporation, Galt, Ont.
Defiance Machine Works, Defiance, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Waymoth & Co., A. D., Fitchburg, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

WORK BENCHES
Fay & Egan Co., J. A., Cincinnati, Ohio.

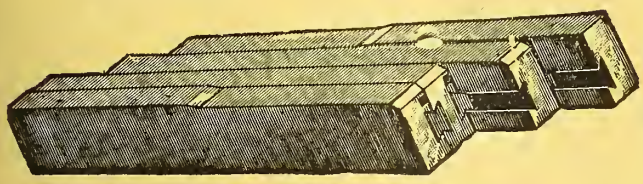
WOOD TURNINGS
Toy Products Co. of Canada, Farm Point, Que.

WOODWORKING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Elliot Woodworker Limited, Toronto, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Reynolds Pattern & Machine Works, Moline, Ill.

WHEELS, Grinding, Carborundum and Aloxite
The Carborundum Co., Niagara Falls, N.Y.

Making TABLE-SLIDES is a Specialty Business

For more than TWENTY-FIVE YEARS we have made TABLE SLIDES exclusively. Our Factory is equipped with Special Machinery which enables us to make SLIDES,—BETTER and CHEAPER than the furniture manufacturer.



Canadian Table makers are rapidly adopting WABASH SLIDES

Because { They ELIMINATE SLIDE TROUBLES / Are CHEAPER and BETTER

Reduced Costs / **Increased Out-put** { BY USING **WABASH SLIDES**

MADE BY

B. Walter & Company

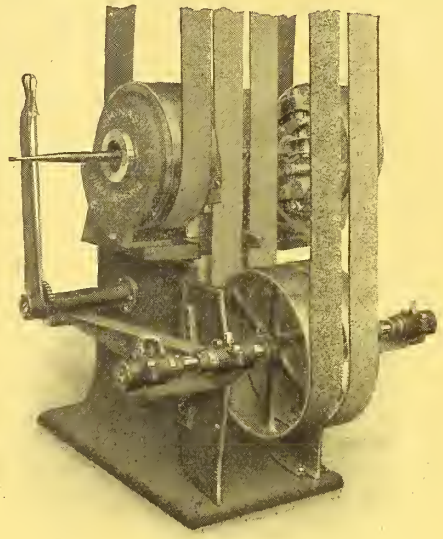
Wabash, Ind.

The Largest EXCLUSIVE TABLE-SLIDE Manufacturers in America

ESTABLISHED-1887

RELEASE YOUR MEN FOR

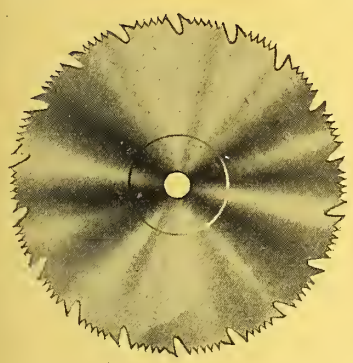
HIGHER DUTIES



The Nash Sander can help mightily in the solving of your labor problem.

It can do the work of **5 men.**

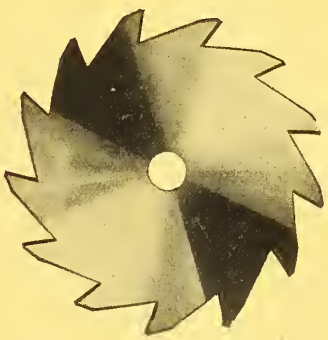
J. M. NASH, MILWAUKEE, Wis.



ATKINS

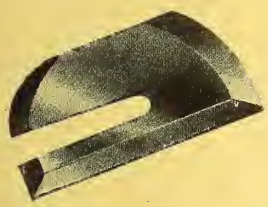
STERLING QUALITY

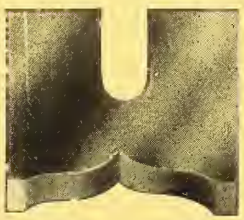
SAWS and KNIVES



The best steel—the most careful and accurate workmanship—the equipment that will eventually save you money.

Atkins Sterling Quality Saws and Knives are proving their superiority by competitive tests in the largest plants of the country. We welcome your most careful investigation, as we know the satisfaction that will result.





Write to-day for our Knife Booklet "C W" and Pattern Template Paper.

E. C. ATKINS & CO.

Makers of Sterling Saws

Factory—HAMILTON, Ont. **Vancouver Branch—109 Powell Street**

—a Battery of "Automatics" at Stickley's

Furniture plants as efficient and modern as that of Stickley Bros., Grand Rapids, are few and far between. This firm permits no "half way spirit" in any part of its organization—it is noted for doing things on a big scale.

The fact that they now run four Mattison Lathes and keep them busy every minute shows to what extent they produce turned work—and the fact that our machines were chosen to "fill the bill" is convincing evidence that nothing better was to be had.

MATTISON
Automatic
The Standard Shaping Lathe
OVER 2000 IN USE

These "AUTOMATICS" can produce round turnings in one-tenth to one-fifth the time required on the hand lathe—squares and octagons in one-thirtieth to one-tenth the time required by band saw and shaper methods. And in the matter of design, they have outstripped the possibilities of hand-turning so far that many of today's most popular designs could not be attempted by any other method even if cost were not a consideration.

The Mattison "AUTOMATIC," moreover, is practical in **any** plant, because its simplicity enables any ordinary mechanic to operate it and because small quantities as well as large may be run through economically.

Our new descriptive circular on this machine will be sent to any one interested.

C. Mattison Machine Works

883 FIFTH STREET, BELOIT, WIS.

Volume Seventeen TORONTO, SEPTEMBER, 1917 Number Nine

CANADIAN WOODWORKER and Furniture Manufacturer

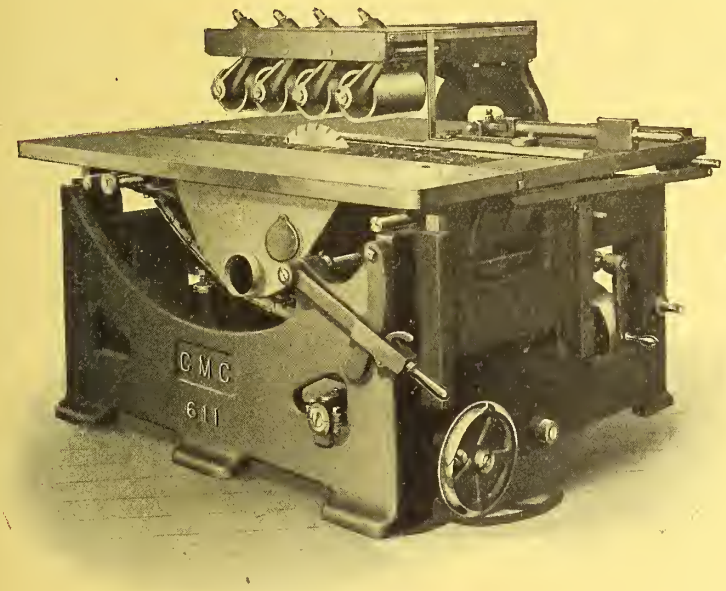
Four Strong Points

HEAVY CONSTRUCTION
SATISFACTORY OPERATION

SIMPLE DESIGN
ACCURATE WORK

These are Special Features of our

No. 611 Straight Edging and Jointing Machine



The design of this machine at once appeals to furniture manufacturers and woodworkers. It meets the demand for a more accurate ripping machine. Stock can be ripped so true that when a flat joint is called for, the pieces can be immediately glued together without further correction; the result is a considerable saving of material and the time spent on the usual succeeding jointing operation.

The design of the feeding apparatus allows one piece to be fed immediately after another.

The operator's safety has been one of the first considerations. Once the stock is engaged in the mechanism it is impossible for it to be thrown back on the operator.

One of Canada's largest furniture manufacturers is using this machine with remarkable success.

Ask for Bulletin giving details of construction.

CANADA MACHINERY CORPORATION
LIMITED

Toronto Office and Showroom: Brock Avenue Subway. GALT, ONTARIO

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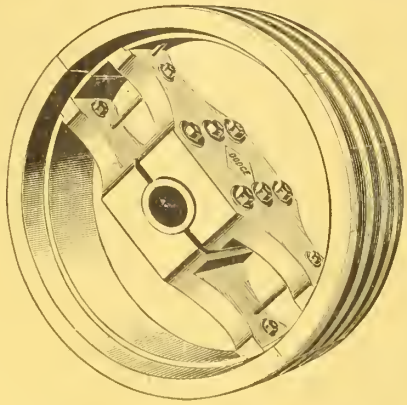
PULLEYS

No Keys

No Set Screws

In Perfect Balance



Lighter

Stronger

Better Belt Surface

The Dodge Standard Wood Split Pulley

The Wood Split Pulley is better than either cast iron split pulleys or steel split pulleys for the following reasons—

The wood pulley is lighter, stronger, better balanced and provides a very much better belt surface. It costs 33 1-3% less money and provides 50% more returns in horse-power value. It may be run at very much higher speeds with no danger of bursting—also it may be had quicker and in a greater range of sizes.

It costs less to get—less to put on—and less to keep.

We make approximately 300 Dodge pulleys every day—everybody uses them.

There are more Dodge pulleys making ammunition than any other kind—you can get them quick.

Every pulley is thoroughly nailed. Every pulley is guaranteed for Double Belts.

We are Canada's greatest pulley makers.

If you have not our Books, write us

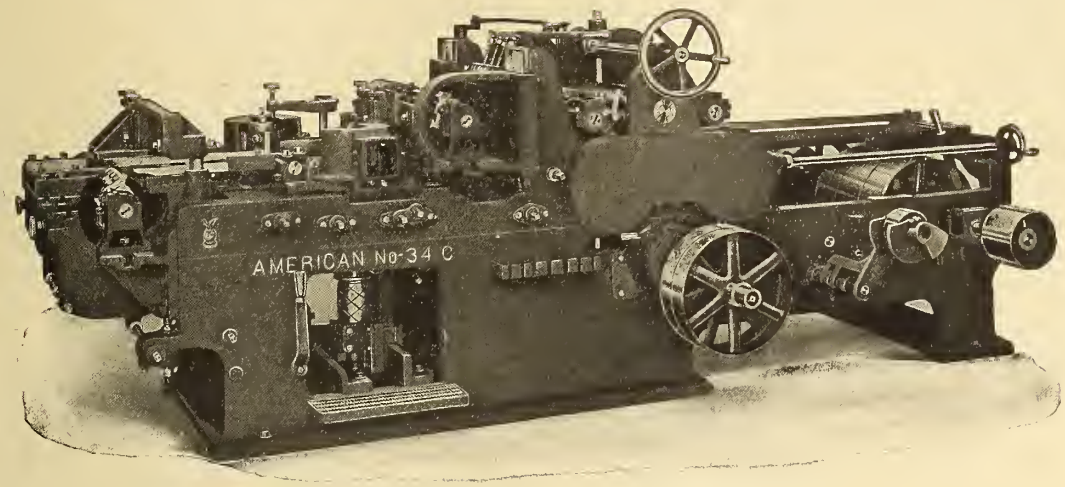
DODGE MANUFACTURING COMPANY

Toronto - - Montreal

GARLOCK-WALKER MACHINERY CO. LIMITED

32 FRONT ST. WEST, TORONTO TELEPHONE MAIN 5346

Fast Feeds— Increased Production = Lowered Manufacturing Costs



American No. 34C Fast Feed Inside Moulder

Here is a new type Inside Moulder—High duty—with detachable bearings and slip on heads, combining many good points of an Outside Moulder, Matcher and Profiler. It is indispensable on large runs of stock mouldings.

Made in two sizes—12″ and 15″ wide by 6″ thick.

Let us tell you about it.

Garlock-Walker Machinery Co., Limited

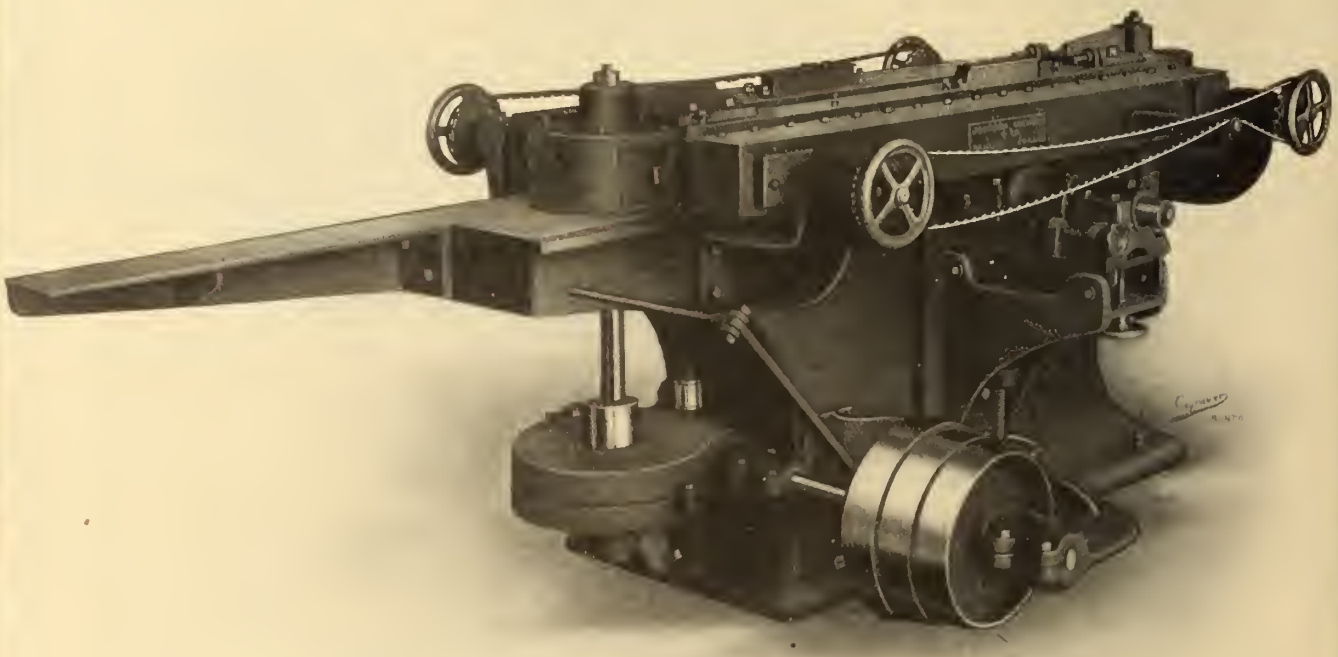
32 Front Street West, TORONTO

METAL and WOODWORKING MACHINERY of all Kinds

Will do the work of Five Hand Jointers in making Glue Joints

This is the guarantee given with our

No. 4 Continuous Feed GLUE JOINTER

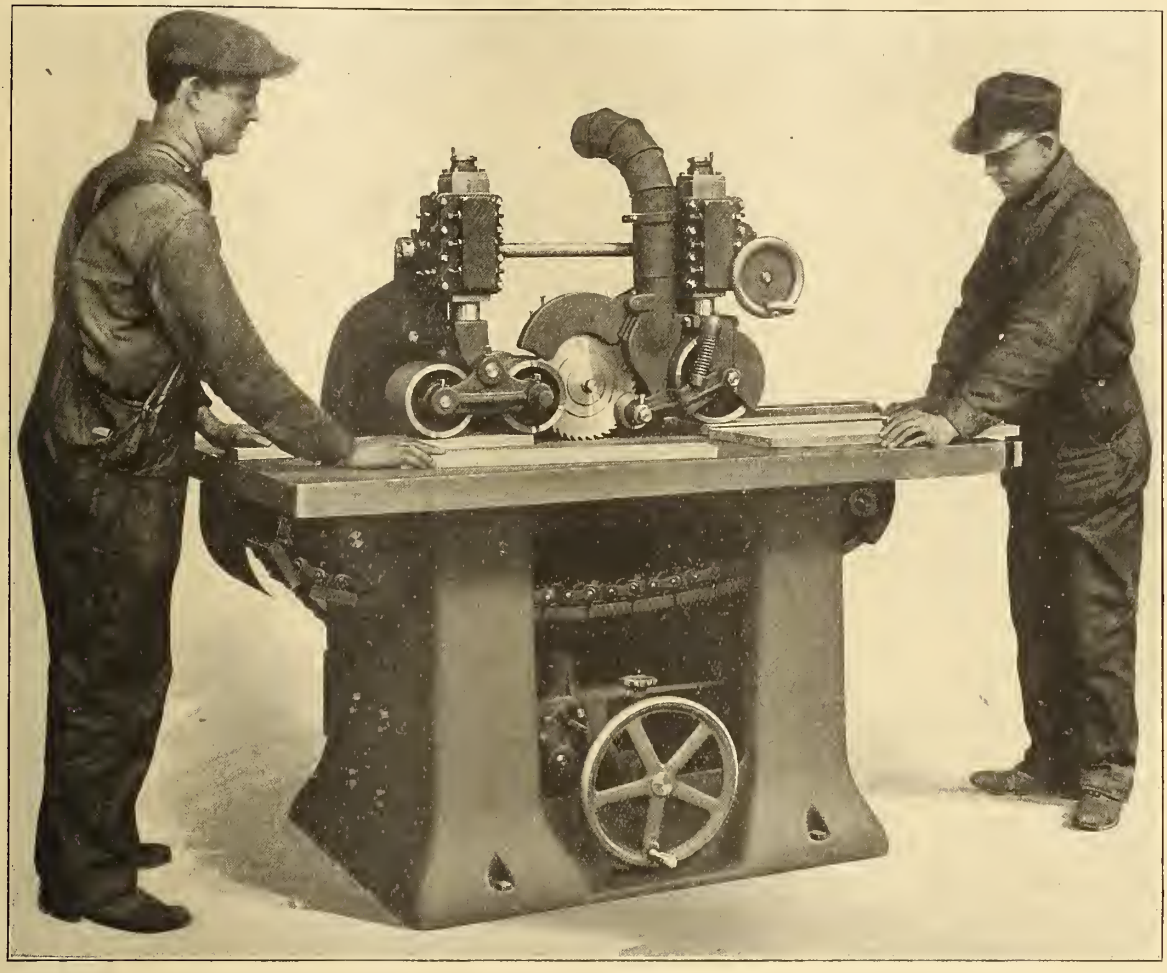


Strongest and most complete machine on the market.
Any part may be readily removed or renewed.
Feeds in opposite direction, giving 100 feet per minute.
Works material from six inches up to any length desired.
Also from one quarter to 3 inches thick, and from three-quarters of an inch wide up to any width.
1 set Shimer Special Jointer Heads supplied with machine.

Investigate the merits of this machine—it will pay you!

Jackson, Cochrane & Company

KITCHENER, ONTARIO



Invariably Straight Ripping Without Effort

All the time an operator spends holding stock to a straight line saw cut is lost production. Lost production is lost profit. Under present high-cost conditions manufacturers cannot afford to overlook any means that will save loss in production. Any machine that will save the time of even one man has added that man's wages to the manufacturer's profits.

The Yates Edging and Ripping Saw

adds the time of several men. The fact that the operators need only to feed the stock and take it away from the machine saves for productive effort all the time lost with hand-feed saws. It is not necessary to hold the stock in the cut. The automatic chain feed takes care of that so perfectly that a straight saw cut invariably results. If the Yates Edging and Ripping Saw saved the wages of only one skilled man a year it would pay for itself in that time. But it does more. It pays for itself in a few months, and then begins to pile up profits. That's the experience of owners all over the country.

Send for our free "Circular G-2." Tells all about the Yates Edging and Ripping Saw.

P. B. Yates Machine Company Ltd.

HAMILTON, ONT. CANADA

DAYLIGHT vs. DARKNESS

WHETHER your men are working at Fitting, Polishing, Veneering, Enameling, Carving, Upholstering, or Color Matching—they naturally produce their best work by daylight.

All labor works most efficiently and economically under the most favorable conditions.

The woodworking plants of Canada are being run to fullest capacity and the urgency of demand requires work during the late evening hours and even throughout the night.

Speeding up labor is difficult at best, but it is much easier to secure maximum effort from men when they are working under the most natural conditions. It's natural for men to work during the hours of day light but during the short Fall and Winter days when there are but a few hours of daylight, some means of artificial illumination must be adopted. Therefore, the matter of giving labor a light as nearly approximating daylight as possible during the hours of darkness is of prime importance.

To operators, plant owners, superintendents, and foremen, the question of how to secure daylight in darkness is the problem.

THE LACO-NITRO LAMP "The Light That Gives MORE Light"

SOLVES THIS PROBLEM.

We offer in the Laco-Nitro Lamp a tungsten filament in a nitrogen gas filled bulb. This lamp represents the highest development of the tungsten lamp. The tungsten filament in the nitrogen filled bulb gives a clearer, whiter light and greater candle power per watt than any other type lamp.

Your nearest dealer can supply you.

Stocks available at

MONTREAL, TORONTO, WINNIPEG and VANCOUVER

Warehouses

THE CANADIAN LACO-PHILIPS CO., LIMITED

The "Shimer Limited" Expansion Head

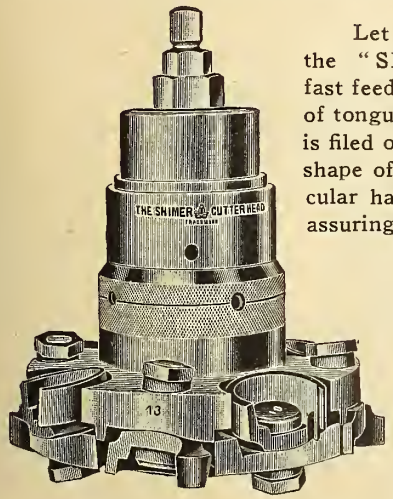


Fig. 627

Let us draw your attention to the advantages of using the "SHIMER CUTTER HEAD" for general Mill and fast feed Planer work. The Cutter is turned to cut the shape of tongue and groove desired, so that to sharpen the cutter it is filed or ground on its face, guaranteeing the user the same shape of cut during the life of the cutter. The bit being circular has from 3½ in. to 5 in. cutting length to the cutter, assuring long wearing life to the cutters.

Note that the cutter, being fastened to a concave seat on a compound angle, assures the user of the proper clearance of cutters, consequently they never burn.

These heads are fitted with or without the Self-Centering Sleeve, and made Expansion or Solid, to suit the customer's wishes.

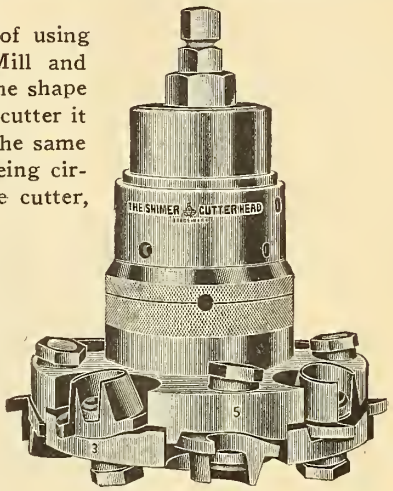


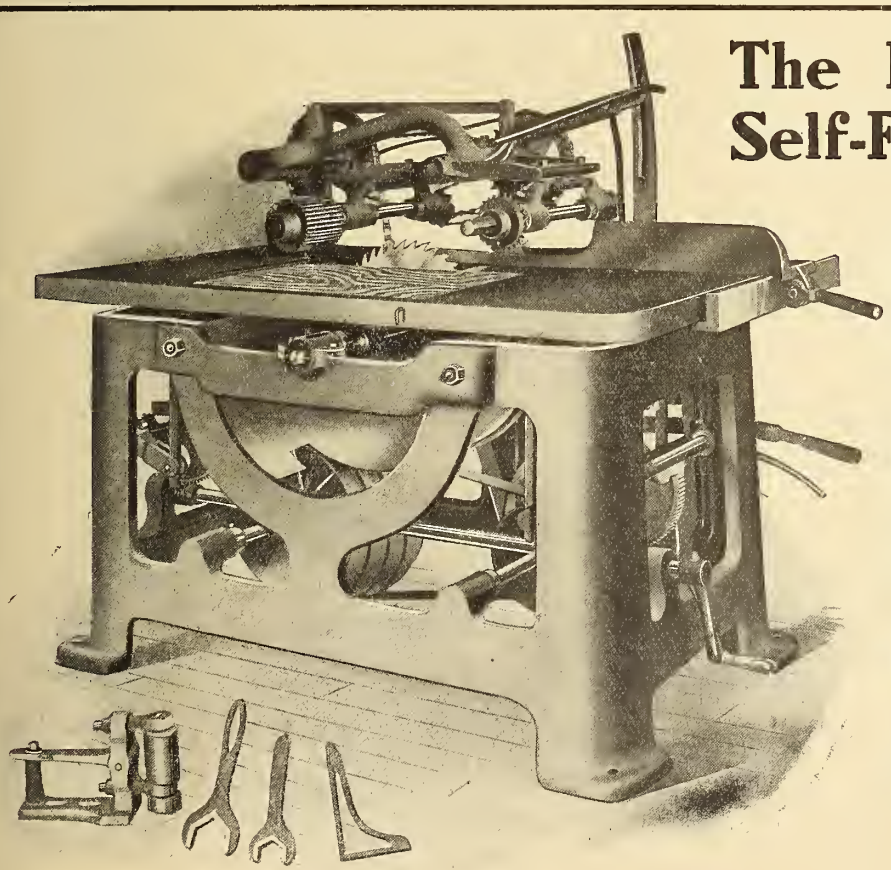
Fig. 268

Shimer Heads have been in use for sixty years, and their reliability and reputation have spoken for them in the past. Let us know your wants and we will guarantee their reliability at the present.

SHIMER CUTTER HEAD CO. OF CANADA, LIMITED

Successors to Samuel J. Shimer & Sons, Inc.

GALT, ONTARIO



The New Hoosier Self-Feed Rip Saw

This is our Standard or No. 1 Hoosier Self Feed Rip Saw, which is now built with hinged upper feed works so that they can be quickly and easily raised up out of the way and the machine used for hand-feed work.

The machine is capable of ripping as thick as 6 in. and as wide as 20 in., and can be used for single, gang, or bevel ripping, the feed being strong enough to pull six saws through 1 in. stock. Four rates of feed are provided from 35 to 150 ft. per minute.

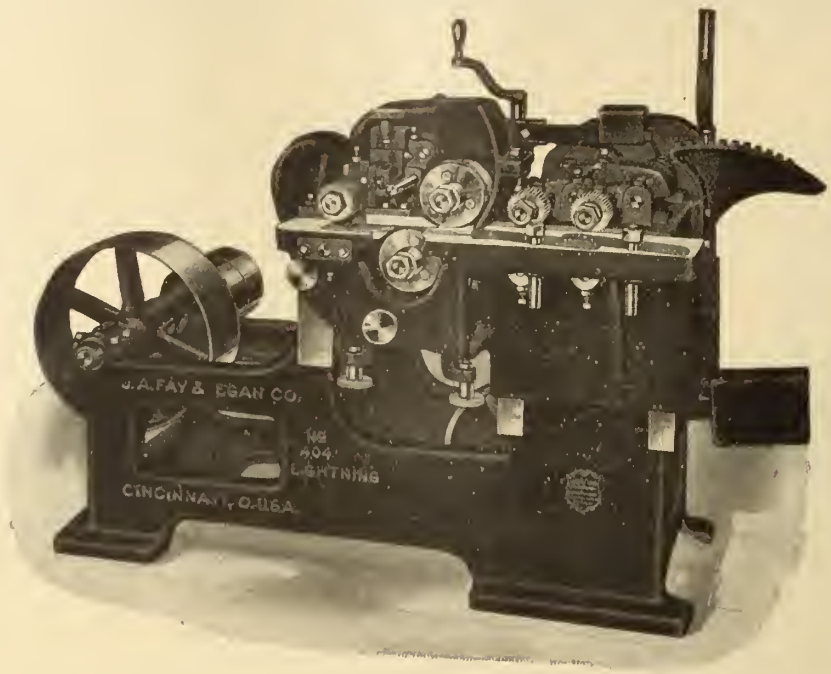
To take care of special ripping problems we build Hoosier Rip Saws in seven other styles.

For further information address

The—

Sinker-Davis Company

INDIANAPOLIS, IND.



A NEW MACHINE FOR MAKING PENCILS, SKEWERS, DOWELS, AND ESPECIALLY *FLAG STICKS.*

PENCILS — Stock of foreign made pencils, imported before the war, are exhausted—a new supply must be manufactured. This machine makes the wood part, round, hexaround or hexagon.

SKEWERS — Always in big demand—a good staple product—made on a No. 404.

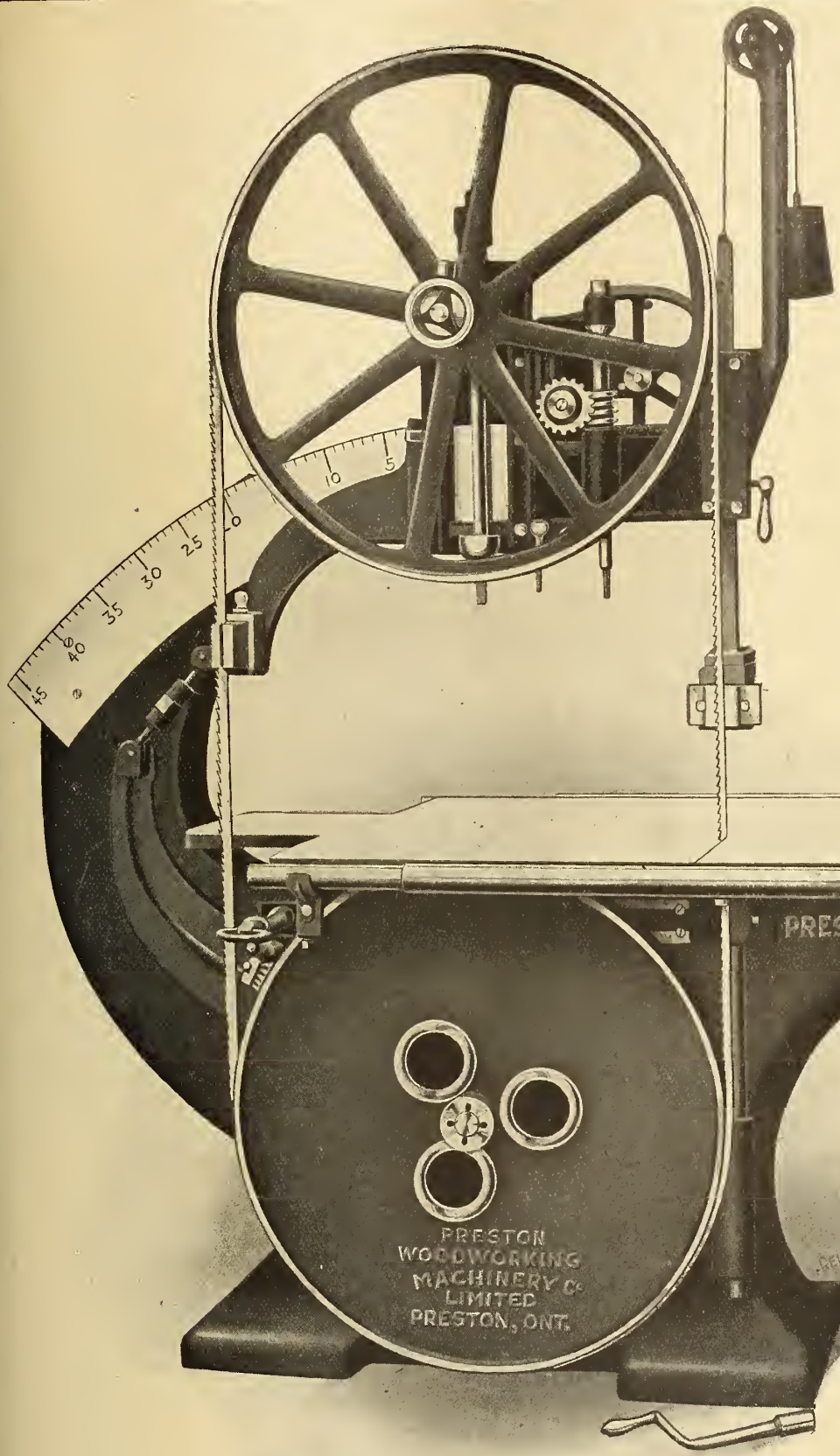
DOWELS—More used now than ever—big demand for use in wood ship and small boat construction — No. 404 makes them.

FLAGSTICKS — Right now stocks are completely exhausted—big demand unsatisfied—market will continue strong—No. 404 the only real flag-sticker made.

This is a new big production machine — Get one now—It will pay you well—Ask for Bulletin E-15.

J. A. FAY & EGAN CO.

153-173 W. Front Street CINCINNATI, OHIO



Canadian Shipbuilders

Ask us for a circular of this machine, built specially for your needs.

Built absolutely on honor and the most up-to-date machine of its kind made today.

It will appeal to the small shop as well as to the large. The price is right, and it will mean for you a tremendous saving in labor as well as a wonderful increase in production.

For good delivery, write us at once, as we have sold considerable already.

No. 133 Preston Adjustable Ship Band SAW

HAND FEED MACHINE
Wheels 42″ Diameter
Angles 45° to Left and 10° to Right

FOR POWER FEED MACHINE, SEE CIRCULAR NO. 134

The Preston Woodworking Machinery Co. Limited - Preston, Ont.

SALES AGENTS: A. R. WILLIAMS MACHINERY COMPANY, ST. JOHN, VANCOUVER AND TORONTO

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Edward Clark & Sons

Toronto

CANADIAN HARDWOODS—winter cut **Birch, Basswood, Maple**

Ontario and Quebec Stocks, East or West, rail or water shipment direct from mill to factory.

Let us quote you on:

5/4, 6/4, 8/4, 10/4 and 12/4 Birch

High grade 1sts and 2nds and No. 1 Common, running well to long lengths.

We Commend to Your Notice:

Our lumber is **reliable**, our grades **uniform**, our shipments **prompt**, and **receive personal supervision**; our prices **consistent**. We have had **long experience**. We desire **to serve**.

Hartzell's Choice Walnut

Forty years' experience in manufacturing High Grade Walnut has earned for us the reputation of being able to furnish a class of Walnut that is unequalled.

Our tremendous stock of selected Ohio and Indiana logs furnishes an unlimited selection as to color and figure.

Picture of section of our log switch. Frequently twenty-five cars are awaiting release, there being about one hundred and fifty cars per month regularly coming into the Hartzell Walnut mills.

All of the material is handled by gravity straight forward from the log pond, through the mills, steaming department, dry kilns, and into the shipping sheds, where it is loaded without exposure to the weather.

The finest timber, latest improved machinery, and thorough organization are behind "Hartzell Service and Quality."

WHAT ABOUT YOUR NEXT ORDER?

Geo. W. Hartzell, Piqua, Ohio

Specialist in Walnut Lumber and Veneers

Saint Francis Basin Band Sawed Oak

Soft Textured, Evenly Colored, Red and White

QUICK SHIPMENT

An Example of Real Service

"We have placed orders for large amount of Gum, with promise of immediate shipment, but it does not get started, for some reason. Now, if you can make a shipment within a week from this time, you may enter our order."

(Two cars were ordered — car numbers wired our customer one hour after receipt of order—cars loaded same day, pulled from our siding early next morning, and will be wire-traced till delivered.)

We are Headquarters for

St. Francis Basin Kraetzer Cured Gum

Send us a list of your requirements. — Delivered Prices will be cheerfully quoted

GEO. C. BROWN & CO.

Mill—PROCTOR, Ark. **Main Office—MEMPHIS, Tenn.**

We specialize in Tennessee Aromatic Red Cedar

RED GUM

"America's Finest Cabinet Wood"

Among the important effects of the European debacle on the American point-of-view has been the stimulation of pride in, and reliance upon, our own resources. This is good business as well as intelligent patriotic sentiment.

For instance, we have learned that we need no longer go to the Ural mountains or the swamps of Brazil or any other foreign land for truly SUPERIOR CABINET WOODS.

Red Gum is essentially "THE" AMERICAN cabinet wood—and America is proud of it.

Owing to the splendid WORKING QUALITIES, Furniture Manufacturers have found there is a saving of about 20% in actual TIME in manufacturing Gum furniture, as against the time consumed in making the same pieces in other fine cabinet woods. Another point to remember, is that Red Gum lumber comes in better widths and lengths, which affords a BIG SAVING in WASTE material. RED GUM VENEERS are superb—"very sweet" to work with and SELL THEMSELVES to the very best trade. (Yes, Red Gum *Veneers.*)

RED GUM FURNITURE MANUFACTURE HAS MORE THAN DOUBLED IN THE PAST TWO YEARS

We have a great deal of interesting data for furniture manufacturers. Write for it today.

Gum Lumber Manufacturers' Association

1314 *BANK OF COMMERCE BLDG., MEMPHIS, TENNESSEE*

Dry Spruce and Birch

Good Stocks, Prompt Shipments, Satisfaction

C. A. SPENCER, Limited

Wholesale Dealers in Rough and Dressed Lumber

Offices—500 McGill Building
MONTREAL - - Quebec

"Gum of Quality"

Yazoo River Red Gum

as produced by

Thomas & Proetz Lumber Company

3400 No. Hall St. St. Louis, Mo.

is carefully manufactured; soft in texture; dark, rich in color; and admirably suited for furniture and interior trim.

Mills—Belzoni, Miss.; Catchings, Miss.; Naples, La.

If you are not buying from us, write today.

American Hardwood Lumber Co.

St. Louis, Mo.

Large stock of—

Dry Ash, Quartered Oak Plain Oak and Gum

Shipments from — NASHVILLE, Tenn., NEW ORLEANS, La., and BENTON, Ark.

Quarter Sawn Gum

One objectionable feature of Gum lumber is that it has a tendency to warp and twist. Another one is that the thicknesses heavier than inch will check badly in seasoning during some seasons of the year.

In spite of these objections Gum has grown into popularity, during the past few years, faster than any other American hardwood. The low cost, combined with the many excellent qualities of the wood, has increased the demand for Gum nearly 100 per cent. within five years.

It has been found that Quarter Sawing will prevent Gum from checking in seasoning and besides the lumber will dry straight and flat. Naturally the cost of manufacturing is somewhat increased thereby, but the benefits derived by the consumer more than offset the advanced price asked for Quarter Sawn lumber.

It is not the intention to saw for figure, although much beautifully mottled figure can be sorted out of Quartered Red Gum. The main object is to saw the log so that the majority of each board or plank will show grain running at an angle of 45 degrees or less.

The various lines of trade such as Furniture, Cabinet and Automobile factories, etc., require different grades and selections. To accommodate these special needs we saw and sort as follows:

Quarter Sawn Red Gum

Quarter Sawn Red Gum—Sap no defect

Plain Sawn Red Gum

Plain Sawn Red Gum—Sap no defect

We can furnish Quartered Sawn in both 1s and 2s and No. 1 Common Grades. The Plain Sawn is graded 1sts and 2nds, No. 1 Common and No. 2 Common. The thicknesses of the Quartered are 5/4, 6/4, 8/4, 10/4 and 12/4 inch. The thicknesses of the Plain Sawn are mostly 4/4, 5/4, 6/4 and 8/4 inch.

There is a decided difference in the method of different mills in Quarter Sawing Gum, as many consumers know. Very few sawyers understand turning their logs so as to produce a satisfactory degree of vertical and diagonal grain without wasting timber or producing a surplus of narrow widths. Others who attempt it only succeed in obtaining a limited percent that will pass for Quartered stock and the customer is consequently disappointed.

Our Percy, Mississippi Mill put into operation this year is supplied with every modern equipment for manufacturing high class lumber. Our cut at this mill is mostly Gum, and we are Quarter Sawing a good portion of our cut.

The price of Quartered Gum does add to the first cost to the consumer, but the results in most cases make the difference in price inconsequential.

The Korn-Conkling Co.

Cincinnati, Ohio

Dermott Offers You, Mr. Buyer:

QUARTERED WHITE OAK

3 cars 1 in. firsts and seconds.
1 car 1¼ in. firsts and seconds.
2 cars 1½ in. firsts and seconds.
1 car 2 in. firsts and seconds.
5 cars 1 in. No. 1 common.
2 cars 1¼ in. No. 1 common.
1 car 1½ in. No. 1 common.
1 car 2 in. No. 1 common.

PLAIN WHITE OAK

10 cars 1 in. firsts and seconds.
4 cars 1¼ in. firsts and seconds.
2 cars 1½ in. firsts and seconds.
2 cars 1¾ in. firsts and seconds.
5 cars 2 in. firsts and seconds.
½ car 2½ in. firsts and seconds.
½ car 3 in. firsts and seconds.
5 cars 1 in. No. 1 common.
2 cars 1¼ in. No. 1 common.
1 car 1½ in. No. 1 common.
3 cars 2 in. No. 1 common.

PLAIN RED OAK

4 cars 1 in. firsts and seconds.
1 car 1¼ in. firsts and seconds.
1 car 1½ in. firsts and seconds.
5 cars 1 in. No. 1 common.
1 car 1¼ in. No. 1 common.
1 car 1½ in. No. 1 common.

PLAIN RED GUM

5 cars 1 in. firsts and seconds.
2 cars 1¼ in. firsts and seconds.
1 car 1½ in. firsts and seconds.
5 cars 1 in. No. 1 common.
2 cars 1¼ in. No. 1 common.
2 cars 1½ in. No. 1 common.

SAP GUM

7 cars 1 in. firsts and seconds.
2 cars 1¼ in. firsts and seconds.
2 cars 1½ in. firsts and seconds.
1 car 2 in. firsts and seconds.
5 cars 1 in. No. 1 common.
1 car 1¼ No. 1 common.
1 car 1½ in. No. 1 common.
1 car 2 in. No. 1 common.

Will be pleased to name you prices on any items in Southern Hardwoods. If you require well-manufactured stock, containing good widths and lengths, we can serve you.

DERMOTT LAND & LUMBER COMPANY

General Offices 1559 Railway Exchange Bldg. CHICAGO, ILL.

Band Mill and Yards—DERMOTT, Ark.

ANOTHER OAK FURNITURE ADV. APPEARING IN THE BEST MAGAZINES IN AMERICA.

HERE AGAIN

is the proof that we are not only PULLING FOR GOOD OLD

OAK

but also pulling *for those who SELL IT—*

THIS MEANS *YOU.*

Month by month we shall prove to the CONSUMER (*Your Customer*) that *OAK FURNITURE*—is due for a very heavy "COME-BACK."

Does your line meet the issue? If not, it can by next season.

"Good OAK FURNITURE is more nearly 'boy-proof' than any other equally fine cabinet wood." Its elegance, dignity and artistic adaptability are backed by its sturdy resistance to dents and scratches. (Really a quite important point.)

"There is no finer heirloom than good OAK furniture." There is no more *safe* and *enduring* investment—none better worth *insisting* upon.

AMERICAN OAK MFRS.' ASSN.,

LET US CONSULT TOGETHER FOR THE GOOD OF ALL CONCERNED. WRITE US. WE'LL ANSWER.

Room 1408, 14 MAIN STREET, MEMPHIS, TENNESSEE

"All that the Word Implies"

We have endeavored to build up an organization which will insure service to our customers, and will make the term, used in connection with the business of Penrod, Jurden & McCowen, really significant. This is our idea of

"P J M SERVICE"

Scientific Drying **Expert Manufacturing**
Good Timber **Modern Mills**
Satisfaction to the Buyer

Southern Rotary Veneers and Hardwood Lumber

We can take care of your requirements in Southern woods, no matter whether you are in the market for veneers or lumber. Our big Rotary Veneer Mill at Helena, Ark., has exceptionally large units, and can readily supply sizes which are ordinarily difficult to produce. Our lumber mills are cutting some of the finest hardwood stock ever manufactured in America. Tell us what you want—we can supply you.

On account of car shortage, which affects delivery of logs to the mills as well as shipments of veneer—we urge all buyers of veneers to place requirements at least 60 to 90 days in advance.

P J M

Penrod, Jurden & McCowen (Incorporated)

General Offices, MEMPHIS, TENN.
Bank of Commerce Building

P J M

116 Walnut Trees

The picture shows one of them. They are situated in Platte County, Mo., and are said to comprise the finest lot of Walnut Timber in the country. It has been handed down by two or three generations without any of the timber being cut.

The purchase of this beautiful stand of choice Walnut trees is indicative of "Penrod" enterprise. From buying the timber to distribution of the lumber, veneers, etc., to users, we give our customers the benefit of thirty years' experience. Immense stocks are always carried, giving an almost unlimited choice of color and figure.

Remember "Penrod Service."

Penrod Walnut & Veneer Co.

KANSAS CITY, Mo.

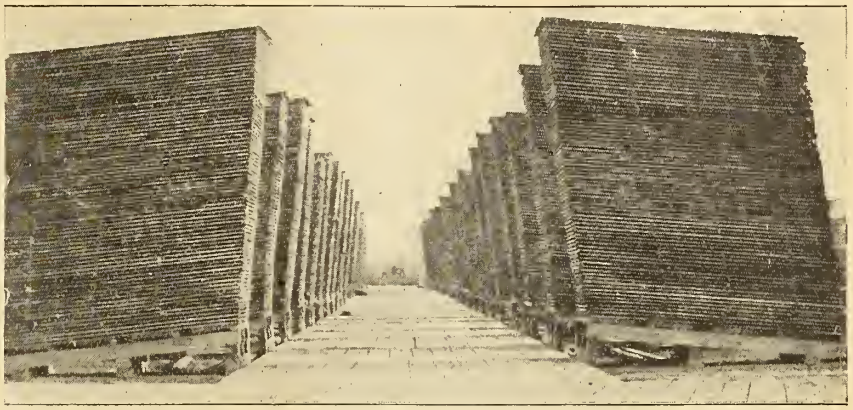
A view which shows the class of logs we are obtaining to supply our customers' needs in Walnut.

This log is one of the best that has been produced in the Central States and a number of experts on Walnut have judged the stump to be the best figured stump that has been produced in years.

Pickrel Walnut Co.

St. Louis, Mo.

Two Conclusive Proofs Why You Should Buy Your Lumber From Us



Examine closely the picture above, then read the following letter we received a few days ago from one of the largest manufacturers of Mouldings in the world. (Lumber for Mouldings must be absolutely flat and straight.)

"We have been using exclusively gum lumber, both sap and red, shipped by you for the last three years, and have been well pleased with its character, both as to grade and condition. The condition of same being an evidence of careful handling before shipping. We have been well pleased with the transactions which we have had with you, and will endeavor to continue using your stock as long as available."

We also manufacture Oak, Ash, Elm, and Cypress at Louise, Miss., mills. Get our prices before placing your orders and become a SATISFIED user of Gum or one of the other Southern hardwoods.

BARR-HOLADAY LUMBER CO.

GREENFIELD - OHIO

We want your ORDERS for

CABINET WOODS:

Walnut
Mexican Mahogany
Quartered White Oak (fine figure)
Plain White Oak (soft texture)
Ash, Cherry, etc.

Our prices are right—have a complete stock—can ship immediately.

Canadian Representative:
A. E. KLIPPERT
11 Laxton Ave., TORONTO
Phone Parkdale 1354

LELAND G. BANNING

CINCINNATI, OHIO

HARDWOOD
THAT'S
DRIED RIGHT

M B

In these days of steam-heated buildings it is very necessary that hardwood for interior finish shall be thoroughly kiln-dried to prevent subsequent shrinking.

The Martin-Barriss dry-kilns are by far the largest in this part of the country. Instruments record the temperature and humidity at all times and other details are worked out with equal accuracy.

You can be sure that Martin-Barriss lumber is properly dried.

The Martin-Barriss Co.
Cleveland, Ohio

NOW IN STOCK

5/8" 1 x 4, 1 x 4 up Spruce Crating
1" Spruce for Shell Boxes
1" No. 1 and No. 2 Hemlock
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Read Bros., Limited
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Churchill-Milton Lumber Co.
Sales Office: Louisville, Ky.
Mills—Greenwood, Miss.; Glendora, Miss.

Let us have your enquiries for—

Ash
Plain Oak
Quartered White Oak
Quartered Red Oak
Elm
Tupelo
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Plain Red
Quartered Red
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Sap
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Qtd. Red, Sap No Defect
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OUR SPECIALTY IS DELTA GUM

The Atlantic Lumber Co.
Manufacturers

Strictly Soft Textured

Quartered and Plain **White Oak**
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Tennessee Scented Red Cedar

High Grades—Quick Shipments

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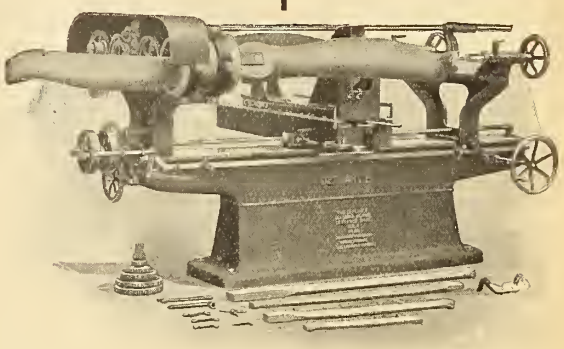
Galbraith & Co., Ltd.
Owen Sound, Ont.
Manufacturers of
"Well-Made" Wood Specialties
Toys, Games, Turned Goods and Kitchenware

We Specialize on
CUSTOMS TURNINGS

Your order will receive prompt attention

Aeroplane Propellers Made at Low Cost

The new Defiance No. 613 Aeroplane Propeller Turning Lathe is made to automatically turn propeller blades of any desired size—to any shape or pitch—and leaves but the final finishing to be done by hand. This machine with a single operator will accomplish the work of eight to ten skilled workmen. It insures correct shapes, and will duplicate struts, as well as propellers, of any design to exactness.



No. 613 Aeroplane Propeller Turning Lathe.

Defiance Aeroplane Propeller Turning Lathe

is the only machine on the market to-day that will successfully turn aeroplane propeller blades. Although before the trade but a short time, it is being installed by many of the leading aeroplane and propeller manufacturers. This machine is not an experiment, but the latest adaptation of the well-known Defiance Copying Lathe—a proven success for the past thirty years in turning various shapes of extreme irregularity.

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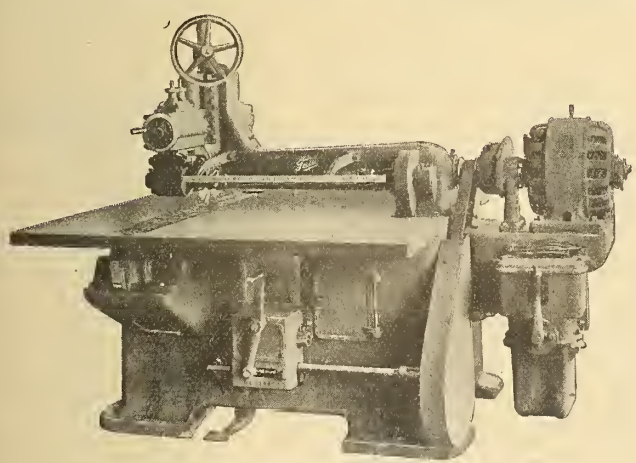
New York City DEFIANCE OHIO U.S.A. London, Eng.

REDUCE YOUR LABOR PROBLEM

to a minimum by installing a

Falls No. 103 Edging and Jointing Saw



Manufactured under patents dated Sept. 8 and Sept. 15, 1914.

With this machine you can edge and rip your stock in an absolutely straight line at high speed. When the stock enters the feed rolls—the operator forgets it and reaches for another piece. The saw will take the stock as fast as the operator can feed it.

You can glue up core and casket stock direct from the saw.

This is *the* machine for producing this class of work at lowest possible cost.

It will pay for itself in a few months.

Descriptive Circular on Request.

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Falls Machine Co.

Sheboygan Falls - Wis., U.S.A.

Exclusive Canadian Representatives:

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We were Really Fortunate in the recent arrival of large, Prime, Figury

African Mahogany Logs

which we are now cutting into

1/28″ VENEER

These logs will produce at least TWO MILLION feet of veneer in:

Mottle—Broken Stripe—Straight Stripe Figure

In widths from 14″ to 28″. A large percentage in right width and figure for phonograph cases.

Advise promptly if you wish to see samples.

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What do YOU use for Drawer Pulls?

B 183

A HINT:

Try Waddell's, on your next cutting.

N-2

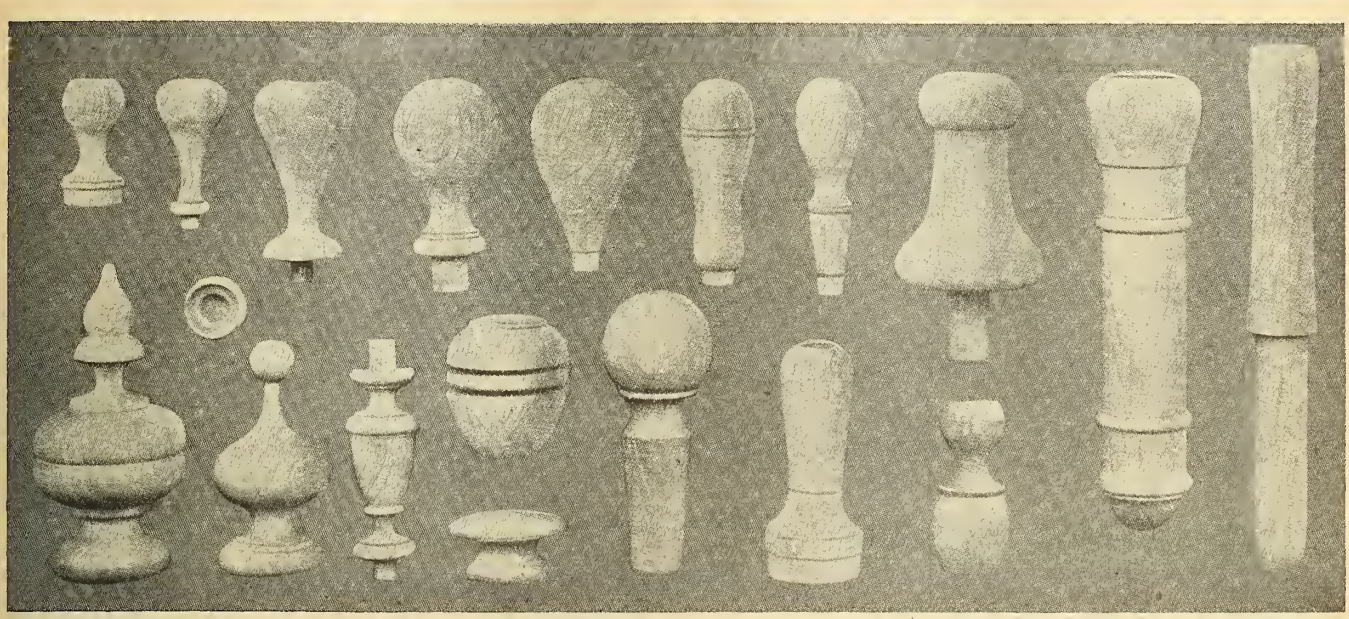
F-5

X-2

WADDELL MANUFACTURING COMPANY

Coldbrook and Taylor, N. W.

GRAND RAPIDS, MICHIGAN, U.S.A.



Dowels and Wood Turnings

Those Smooth Dowels

The new dowel machine is a wonder for efficiency. The new process dowel made from it is round. Always round. There is nothing about the manufacturing process which could produce anything but a round dowel.

It is also always uniform in diameter and never varies more than a few thousandths of an inch from the measurements desired. The dowel is finished and polished with a clean cut lengthwise of the grain and not with a scraping cut crosswise of the grain, as in the old method.

These machines are adjustable to any size from 3/16 of an inch to one inch, making these changes as fine as to a 64th of an inch. Our smooth dowels are straight, round and perfect.

Special Shapes

We show above a few of the many shapes which we can turn out with our special automatic machinery.

We are in the centre of the hardwood district and can turn out any shape wanted, in any quantity, perfect and smooth, at short notice. Write us about anything which you may need that can be turned out of wood.

Dowels the Smooth Kind

Birch, Beech and Maple
Plain, per 1000 Pieces

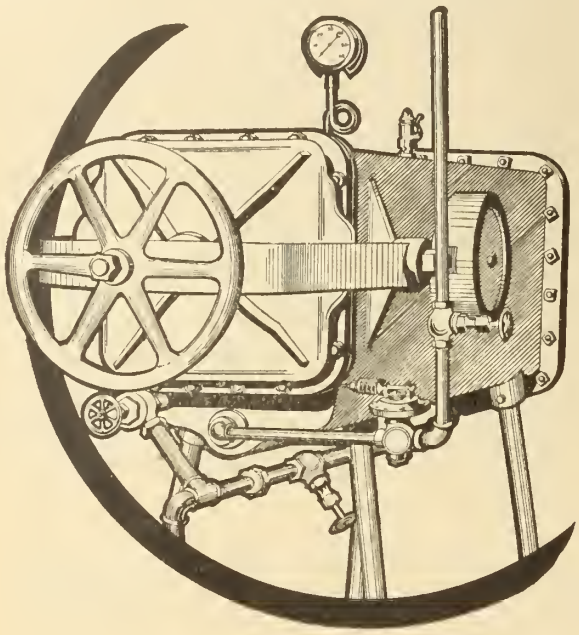
Length	3-16 in.	1-4 in.	3-8 in.	1-2 in.	5 8 in.
12	$1.50	$1.50	$1.80	$2.20	$2.95
16	1.95	1.95	2.40	2.95	3.93
18	2.20	2.20	2.67	3.35	4.40
24	2.95	2.95	3.60	4.40	5.90
27	3.35	3.35	4.05	5.00	6.60
30	4.05	4.05	5.00	6.16	8.20
33	4.50	4.50	5.50	6.75	9.00
36	4.95	4.95	6.00	7.33	9.80
42	5.70	5.70	7.00	8.60	11.50
48	6.50	6.50	8.00	9.80	13.05
54	9.20	9.20	11.20	13.80	18.40
60	11.25	11.25	13.75	16.85	22.50
66	13.05	13.05	16.00	19.55	26.05
72	14.75	14.75	18.00	22.05	29.40
No. DOWELS TO BUNDLE	1000	500	200	200	100

Besides the above sizes, we make dowels up to 1 in. or any fraction thereof. In addition to the smooth kind we make the glue joint dowel in all sizes.

Tell us your wants and get our prices.

Toy Products of Canada, Limited
FARM POINT, P.Q., CANADA
Makers of Wood Products and Toys

Wood Steaming Retort



Wood Bending Manufacturers:

This is one of our

Perfection Retorts

which we guarantee will save you

50% Less Breakage

in your bending department than your present process; that your stock will dry in your forms or presses in one-third less time; that you will have no stained stock; that your stock will retain its shape much better after being bent; that it will dry in your dry-kiln in one-half less time and that your steam consumption will be reduced at least 90 per cent.

The door can be opened and closed in ten seconds, and it is steam and water tight and for this reason can be placed anywhere in your factory.

Compare this IMPROVED RETORT with your present steam boxes, then write us for our Booklet on Progressive Wood Steaming.

Made in Preston, Ontario

Perfection Wood Steaming Retort Co.

PARKERSBURG - WEST VIRGINIA

SHELL BOX WIRES

Let us supply you with these wires, with looped ends, bent to fit the box, ready for nailing.

Our equipment will enable us to supply you any quantity on short notice. Perfect quality. All alike

WE ARE MANUFACTURERS OF

Wire and Wire Products

Bale ties, Heading ties, Lath ties, Hardwood Flooring ties, Wire Nails, Flat Steel or Wire Barrel hoops. All sizes of Fine wire in Bright, Tinned or Galvanized, manufactured to order.

Laidlaw Bale-Tie Co., Ltd.

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Furniture Hardware

Brass Pulls, all the period designs, Desk Pulls, Label Holders, Card Index Rods, Hat Hooks, Desk Slides, Brass Sockets, Sliding Casters, etc.

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Lid Supports, continuous hinges, Needle Cups, Tone Rods, Knobs, Needle Rests, etc.

Trimmings for Smokers' Stands

Weber-Knapp Co.

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Shingle Bands **Hot Rolled Hoop** **Cold Rolled Hoop**

Sheared Bands from Sheet Steel,

Black or Galvanized in gauges of 20 to 30. Any width. Any length in inches or fractions thereof up to 96 inches in length.

PROMPT SHIPMENTS FROM STOCK

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DUST SEPARATORS
100% EFFICIENCY

The Toronto Blower Co. will send an expert Engineer of extended experience to view Plants where the installation of Exhaust Systems are contemplated.

Slow Speed, Low Power
EXHAUST SYSTEMS
WITH THE
"FOSTER" FAN

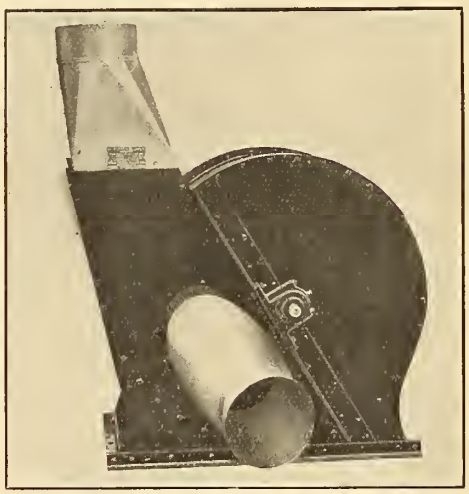
We manufacture a complete line of Fans, Galvanized Iron Pipe, Dust Collectors, Auto-Furnace Feeders, Hoods for Wood-Working Machines, Buffing and Polishing Wheels.

Exhaust Systems a Specialty.

Years of practical experience.

Correctness of design is the most important factor in the construction of an Exhaust System.

Protect your workman.



Note the inlet opening.

It is so placed that air and material is immediately discharged without being carried around fan-wheel. There are two ball-bearings on pulley side of case and one on inlet side.

Efficient fan with minimum power.

Toronto Blower Company
156 Duke Street, Toronto

"DOT EMBOSSED"
300 Foot Coil

Patent Coil Holder

STEEL BOX STRAPPING

SMOOTH EDGES—CONTINUOUS LENGTHS
COIL HOLDERS SUPPLIED
LACQUERED—GALVANIZED——BRIGHT

Write now for Catalog.

ACME STEEL GOODS CO.
OF CANADA, LIMITED
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Corrugated Joint Fasteners

In bulk in Barrels and Boxes.

In coils for Automatic Driving Machines.

PARALLEL SAW EDGE

DIVERGENT SAW EDGE

Choice Red Gum
America's Finest Cabinet Wood

There are great possibilities in Red Gum for the manufacture of medium and high priced furniture.

We specialize in the production of properly dried Red Gum Lumber—noted for its soft texture, beautiful figure, and good width.

The test of Red Gum is its condition after you have had it for a while. Buy from us and you'll find it uniformly right in all respects.

We also manufacture Southern Hardwoods, and solicit your inquiries.

Paepcke Leicht Lumber Co.

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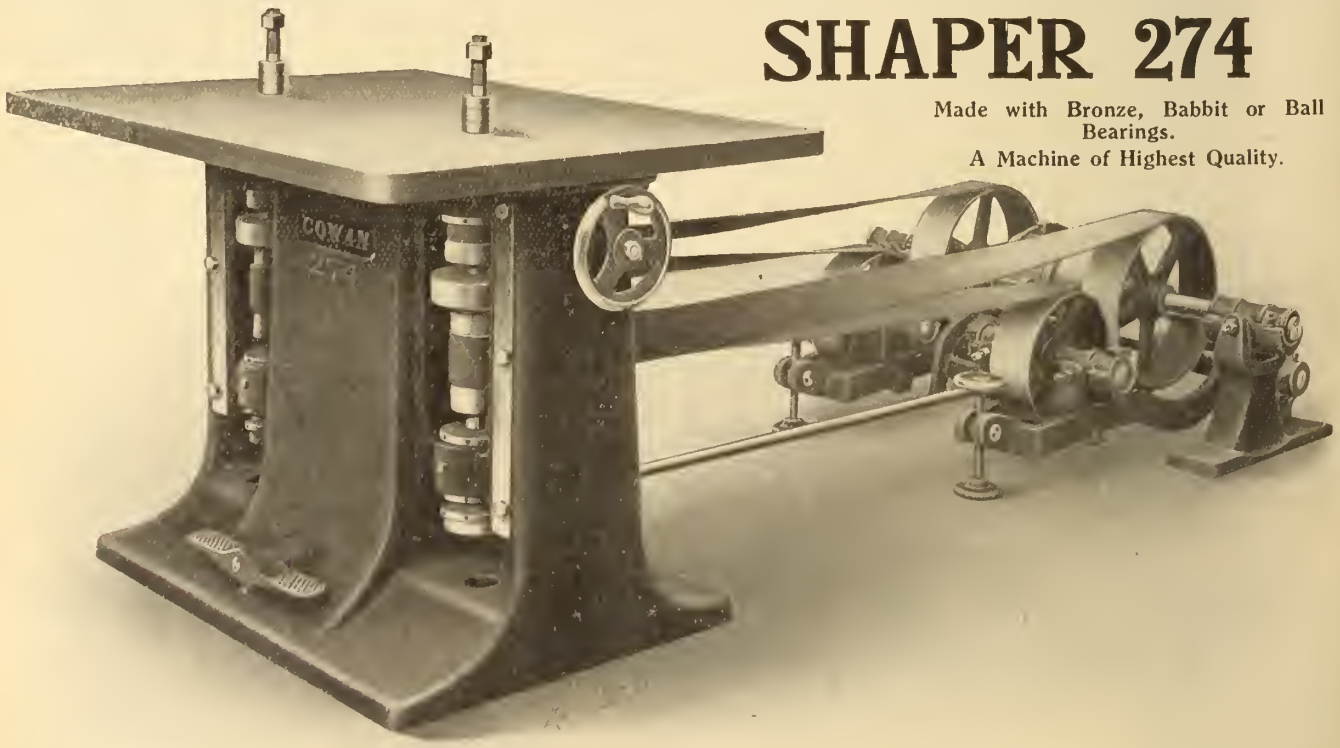
SHAPER 274

Made with Bronze, Babbit or Ball Bearings.
A Machine of Highest Quality.



Descriptive circulars, prices and particulars of this or other Woodworking Machines on application.

COWAN & COMPANY of GALT, Limited, Galt, Canada

Canadian Woodworker

A Monthly Publication in the Interest of the Woodworking Industry.
Reaches the factories producing interior finish, doors, sash, flooring, woodenware, furniture, pianos, boxes, and general mill products.

Subscription, $1.00 a year; foreign $1.50.

Woodworker Publishing Company, Limited

Branches: Montreal, Vancouver, Chicago, New York, London, Eng.

345 Adelaide St. West, Toronto
Phone Ade. 2700

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Vol. 17 **September, 1917** **No. 9**

Furniture Production Number

The special furniture number which we published in October of last year proved so popular with our readers in the furniture industry that we have decided to bring out another one this year. The conditions prevailing in furniture factories at the present time should make a number of this kind welcome. The majority of the plants are busy, but there are difficulties in the way, such as the scarcity and increased cost of nearly all raw materials and the difficulty of obtaining labor, which add greatly to the cost of production.

In these matters it is often valuable to get a fresh viewpoint. By so doing you can learn what other men are doing to offset these increases in the cost of production. The articles to be published in our Furniture Production Number will undoubtedly provide this fresh viewpoint. They will cover a wide range of practical subjects, and will be written by men who are regarded as authorities in their respective fields.

Present indications are that fall and winter sales of furniture will be good. Retail dealers state that, with the exception of a slight falling off in the summer months, furniture sales have been extremely satisfactory. Fall buying has now been resumed and is quite active. One retail dealer interviewed stated that the Conscription Act does not appear to have had any effect on the number of marriages being performed, as there are plenty of young couples buying furniture to start housekeeping.

On the whole, we believe furniture manufacturers will be able to get some good-sized orders during the present fall and winter.

What Cost System Should Show

No part of modern industrial organization is of greater importance than cost accounting. At the same time there is perhaps no part regarding which so little is generally known. In many plants cost finding is still in a crude and undeveloped stage, at least so far as individual detail costs are concerned. This is particularly true of the small shop which has grown up around an aggressive and skilled mechanic whose knowledge of the practical side of the work is all that can be desired, but who does not appreciate the need of scanning his detail costs closely as his business grows more complex.

The demands of modern industry require vastly more of a cost system than was deemed necessary a short time ago. In a great many shops to-day the cost system is considered satisfactory if it simply shows the cost of producing the several items manufactured, and manufacturers seem to be afraid to extend its scope for fear it turns out to be a more expensive proposition than the present lack of system.

The modern cost system must not only show costs as such, but must show them in such a form that deductions may be drawn as to the reasons for them and the possibilities of reducing them. Results must be so reliable that the costs may be used as a basis for predicting future shop operations and costs. Cost-keeping systems that simply record costs for the purpose of fixing sales prices are regarded to have accomplished only a small part of their mission. The tendency among the larger manufacturers to-day is to demand of the cost-keeping department such financial statements as will act as safeguards in the conduct of its individual functions.

Experienced cost accountants state that a properly conducted cost system should enable the manager to prepare estimates with some assurance that a profit will be made, if the work is undertaken, and at the same time should enable the manufacturer to meet competition on an intelligent basis.

One of the most important things it should show is what products pay and what do not. Also a good cost system should be the means by which the manufacturer can ascertain whether each department is being conducted efficiently, and the means by which he can trace the reasons for inefficiency if such exists. One thing to be avoided, however, is that the system installed be

not too complex, and that the cost of securing the detailed information is not greater than the gain that would be derived from its possession.

The introduction of a satisfactory cost system requires more than a knowledge of cost finding methods. It requires an intimate knowledge of the industry itself, of the particular plant in which it is to be installed, and a keen discrimination regarding the detail to which the cost finding is to be carried. Even in the same plant the same degree of detail accuracy is not necessary in all lines, and a skilled chief cost-finder can save money in the operation of his system by a careful observance of the different lines of product. The manufacturer should, therefore, give the installation of a cost system his earnest consideration in order that he may get it started right.

It is of prime importance that the manufacturer in installing a cost system should have a clear idea of just what information he wishes to obtain. The cost-finding system should obtain just the results wished for, and it should not gather a lot of useless data. A cost-finding system can fail because of too much detail as easily as it can because of lack of results.

Woodwork at Toronto Exhibition

The Canadian National Exhibition, held at Toronto annually, is developing more and more into a vast showing of manufactured products, and it is pleasing to note that the woodworking industry is fully alive to the opportunity of educating the public with regard to their products.

Illustrations of two of this year's exhibits, showing hardwood flooring, doors, columns, oak panelling, oak staircase, etc., are reproduced elsewhere in this issue. Displays of this kind are along the right line. From an advertising standpoint we doubt whether it would be possible for manufacturers to find a more profitable way of expending their money, as their products are brought to the attention of the right kind of people.

It has occurred to us that here would be an excellent opportunity for manufacturers of veneers and veneered products to show samples of their goods and distribute instructive literature. It would be an easy matter to secure some veneered case goods in the white and cut away a portion of a top or a drawer front and thus show what veneered and built-up stock really is. If people were educated to the fact that, instead of being an imitation of something, veneered furniture is a superior product it would be a good thing for both the veneer manufacturer and the furniture manufacturer. The fact could be impressed on the public that veneered and built-up stock is really reinforced wood. This statement would be bound to make an appeal.

The veneer manufacturers would derive the most benefit from an educational campaign of this kind, but manufacturers of veneered furniture would also get in on it. We believe, therefore, that the Veneer and Panel Manufacturers' Association could take this matter up to advantage, co-operating with manufacturers of veneered furniture. The exhibit could be put on wherever there was a possibility of bringing it to the attention of a number of people.

Simplifying a Woodworking Operation

Speaking about the shortage of labor in the various industries, caused by the war, Mr. W. H. Bassett, in a recent issue of "System," relates a number of instances where production has been greatly facilitated and the number of men required reduced by a re-arrangement of certain machines. One of these instances concerns a woodworking operation, and is as follows:—

"Wooden sticks were to be cut into blocks about ten inches long, and then turned on a lathe. At first the saw-tables were placed at one end of the room and the lathes at the other—a saw to each lathe. One man operated the saw, another the lathe, and a third carried the blocks from the saw to the lathe. Then the trucking was seen to be unnecessary, and the lathes were moved up to the saws so that the blocks could be taken directly from the saw-table by the operator; that eliminated one man and was supposed to be the top-most point in efficiency, for it saved $4,800 a year in wages on the eight sets of machines.

"But upon further study we put an automatic knockout on the lathe, which enabled one man to feed both the saw and the lathe—cutting the labor bill exactly in half; we hung up a bonus for a certain output, and within a short time the one man operating two machines was turning out more per day than had the two men previously. Doing the logical but so often overlooked thing here saved this company two-thirds of its labor cost and materially increased its production. And yet turning out more material with less labor is supposed to be the greatest of undertakings."

Aeroplane Factories in Great Britain

The Minister of Munitions in Great Britain—Dr. Addison—gave out a statement recently to the effect that there are 100 factories in Great Britain engaged on some process or other connected with the construction and equipment of flying machines. Dr. Addison says that output is increasing by leaps and bounds, and, taking the figures merely as a comparison, states that where 100 aeroplanes were produced in May, 1916, the number rose in May of this year to more than 300. He states that even this rate of increase is being accelerated, and that the output in December will be twice what it was in April, and the December total will be far surpassed in succeeding months.

A pessimist is a person who tells you that what appears to be a silver lining in your cloud is only a low grad of toinfoil.

Moulder Troubles and where to Look for Them

Fifth Article of a Series—Overcoming the Balky Feed—Detecting the Causes of Waves in Stock—Applying the Remedy

By S. E. Saunders

The diagnosing of moulder troubles is very close of kin to the running of the moulder, and it will be plainly seen before the end of this chapter is reached that it is a very difficult thing for the beginner, or even for older men at the trade to always tell where the trouble lies.

Let us begin with the balky feed, as we left off on the feeding subject in the last issue of the "Canadian Woodworker," and again, as it might be one of the first troubles to occur to the beginner. When the stock stops in the machine look first and see if it has fed out from underneath the rolls and is waiting for another piece to push it along.

Next ascertain whether the feed works are right; your belt may be broken or have slippd off. If your feed works are right, look and see if your side heads are running, and possibly the top head, as these may be choked down and remain unnoticed when covered up with the shaving hood. If these are all right, look for slivers next to the inside head and in front of the rear bed; also see that none of the movable guides have twisted around and dug into the side of the moulding.

If all the above suggestions fail, examine the pressure bar and guides for proper tension. Perhaps the stock you are running is of a gummy nature and sticks on the bed. In this case use a little oil on the pressure bar and on the bottom side of mould. If the trouble is still a mystery, it may be caused by the stock being too crooked to pass between the stops. In this case, loosen up your side guides a little. An irregular feed may have several causes; it may be slipping belts, dull, corrugated rolls, or perhaps insufficient weight on the pressure lever. The cures for these will suggest themselves.

The trouble, or troubles, indicated by waves in the moulding surface are possibly a dozen in number, yet one accustomed to the machine and work may tell at once the cause of uneven knife work.

Waves caused by too fast feeding are of an even depth and length. Those caused by loose bearings are of an uneven depth, irregular, and show up worse in a heavy cut, but may not be noticed in a light cut with a tight belt. The tight belt will hold the spindle down to the bearing so long as the cut is not heavy enough for the reaction to lift the head up into the slack space.

When the babbit gets loose in the housings it will cause waves which are characterized by a certain shallowness and a steady, though uneven, surface. These are the hardest to distinguish from those made by loose journals, and also the hardest to remedy. The loose babbit may often be expanded by the liberal use of a punch, but the best and cheapest is to rebabbit the bearings.

Another perplexing cause of waves is that of springing knives. These waves may be discovered easily, as they occur only in the hard cuts, and are seldom seen in a soft piece. The causes may be: The knife is bent back before it is put on the head; the cut may be too hard for the knife extension, in which case the cap should be longer. See that cutters are sharp, for dull knives will spring in places where sharp ones will do good work. The waves caused by the oscillation of the mandrel are easily distinguishable by their occurrence on the sides of the deep cuts, while the surface cuts may be perfectly smooth.

With the later makes of machines this is very simple to remedy, by using the adjusting set screw or the cone collars on the end of the arbor. The older makes of machines, with the V-grooves on the shaft, will possibly necessitate rebabbiting to ensure no end play.

It sometimes occurs that when the operator raises or lowers the bed he forgets to tighten up the binder bolts, thus causing an annoying and foolish search for trouble.

Another set of waves, very perplexing to the beginner, is caused by the chip-breaker riding on only one edge of the stock while the other edge is comparatively loose under the knives. Waves are sometimes caused by warped lumber which is too strong for the machine to hold down and feed through. There is no remedy for this but to keep the chip-breaker loaded down to the limit and work your pressure-bars as tight as feed will permit.

Bad or lumpy lacing in the belts or a short piece considerably thicker than the rest of the belt will often produce waves, especially on side-head work. Again, if the side-heads have too much play up and down it will cause waves, but ordinarily this will make little difference. If the side knife reaches out over the stock the hardness of the wood may cause the arbor to lift, as it requires but little to do this when the spindle is whirling at from 4,000 to 5,000 revolutions per minute.

Slack belts on the side-heads will often permit them to slow down almost to a stop and then pick up again and run full speed for a while, after which the operation is repeated, giving the edge a choppy look in places. Some operators never notice this slow down, and look for the trouble in the wrong place. Another place to look for trouble is at the bottom feed rollers. If these are set too high and the operator is feeding heavy stock, there will be a looseness all along under first cutter-head. Remedy this with use of straight-edge, setting rollers to feed down on the table and having second under roller a little lower than first one.

The chipping of the last end as it feeds out from under the chip-breaker can only be remedied by careful feeding and a snug pressure-bar. When it is possible, the stock should be fed with the bow side up, which will guard against chipping at either end, besides being much easier for the carpenter to put on. When a board must be fed from the hollow side up there is no way to keep it from chipping as it slips out from underneath the chip-breaker, and the heavier the lumber the deeper the chip.

One of the most annoying things that happens to the feeder is to have one of the heads stop and stock crowd ahead until the feed stops. To get it back, quickly lift the feed rolls, loosen the pressure bars, and take a heavy hammer and drive the piece back until the head will run again. If a big sliver catches and stops the feed, take a chisel and hammer and cut it off close to the board. If the feeder sees a head slow down and stop, he can generally throw the feed off

before the piece is crowded ahead too far. Slipping belts may be detected by the heat they generate in the pulley on which they slip.

The trouble of knives working out from under the caps is annoying, expensive, and dangerous. They generally start with springing, and if the operator is familiar with the peculiar sounds referred to before in this series he will stop and fix up before the "tear-up."

I have often heard moulder men say they had bolted the bits down tightly, while in reality they had only tightened them with their fingers and had forgotten to use a wrench.

In most cases, if a knife is put on as tightly as possible with the fingers, under a freely running nut, it will not leave the head until just as it strikes the wood. If the wrench has been used at all, it will not fly out at once, but will gradually work out, until it strikes the bed or flies out from under the cap. The troubles incident to keeping the machine in repair, the belts in order, rebabbiting, etc., will not be discussed here, as they belong rather to the machinist than to the operator.

In conclusion, might we not say, "It is strange how few men in charge of machinery in factories exercise common sense in righting any little wrongs that may develop in the machines under their care." Thus many of the so-called troubles in the machine are due to carelessness of handling. Here let me turn the subject over to the man behind, or, rather, in front of the machine, hoping that these suggestions may be the means of his finding more economical methods even than those I have mentioned, and that the studious apprentice shall have renewed interest in "the art of running a moulder."

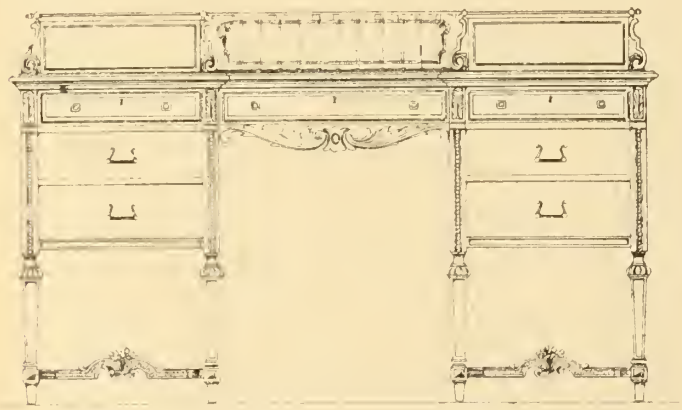
Dining-Room Suite from Louis XIV Motifs

Chairs Have Upholstered Seats and Backs—Carved Underframing a Feature—Pedestal Table Suggested as More Likely to Meet Modern Requirements

By Walter Wrench

It is hard to define the style tendency of the fashion in furniture as exemplified in the showings this season at Grand Rapids, Chicago and New York, so varied are the offerings in style and character. While furniture of the William and Mary, Queen Anne and Italian Renaissance periods are popular, the Chippendale showing decided Chinese influence, is well represented. So also is Louis XVI.

Whatever the leading style in vogue may be, there will always be a ready sale of substantial well built furniture to the large class of people who do not slavishly follow the fad of the moment, but buy on the merits of artistic value and good cabinet making, irrespective of period classification. With this thought in mind the author has chosen the little exploited period of Louis XIV as the subject of a design for a dining-room suite this month. Furniture of this period was substantially and solidly built, yet lost nothing in artistic value and consequent appeal, because of this fact.



Sideboard is six feet long but can be shortened if desired.

Before describing our adaptation we will give a brief summary of the general characteristics of this style in order that the spirit of our design may be more easily interpreted.

Louis XIV.: 1643 to 1715. This period covers in English history, the Civil War and Commonwealth and the reigns of Charles II., James II., William and Mary and Anne. When Louis came of age he personally fostered the creation of the style named after him. His palaces were sumptuously furnished and decorated. It was because of this love of luxury in living and surroundings that Louis was dubbed the "Grande Monarque."

The designers of the time number among them such men as Berain, Le Pautre, Henri de Gissy and Daniel Marot. The last named exerted the most influence during the second half of the reign of Louis, and his furniture and interiors exemplify the best influences of the period. The characteristics of Louis XIV. furniture are described herewith.

Case Goods

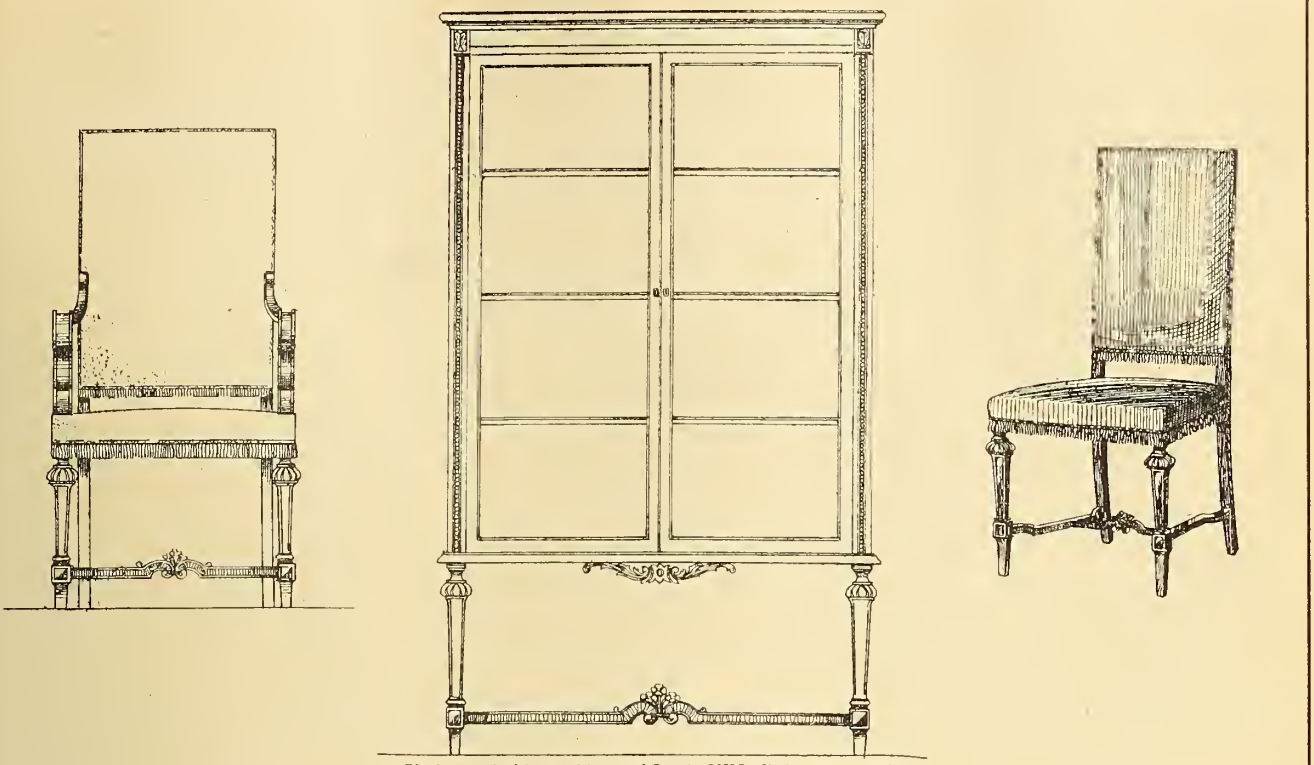
During the early part of the reign of Louis XIV. furniture was designed on architectural principles and was on somewhat severe lines. The early cabinets, commodes and the like were massive, but the design being skillfully executed, obviated any suggestion of heaviness. Later, with the advent of Boule, more refined types came into being; the straight fronted cases gave place to shaped fronts, and carved and shaped legs superseded the square, straight type. The decorations, whether carved or inlaid, were in the form of allegorical figures or geometrical designs. Many beautiful clock cases were produced at this time and authentic specimens are now worth fabulous prices.

The formal tables of the period were invariably square and set on square shaped legs richly carved. Small tables were often set on legs elaborately scroll cut, or upon a series of six or eight legs connected with an elaborate underframing. A richly carved form of cabriole leg was also in vogue at this time.

The console tables were particularly magnificent in design, being carved with figures from mythological tales and also with fruit, flowers and vases in rich but well balanced profusion. Such tables as these defy profitable reproduction in the modern furniture factory. The rims of tables of this era were generally fluted or carved with formal designs.

Chairs

The chairs of the Louis XIV. period are particularly worthy of note. This was a luxury loving age and the chairs certainly were designed to yield the



Chairs and china cabinet of Louis XIV. dining-room suite.

maximum of comfort. The typical chair always had an all-over upholstered seat and back, the back being raked at a restful angle. Arm-chairs had excellently designed arms with curves so proportioned as to yield the comfort desirable. The legs of chairs were always connected with an underframing, moulded and carved. The fringe on the back and seat of chairs is a characteristic of the time.

The Finish

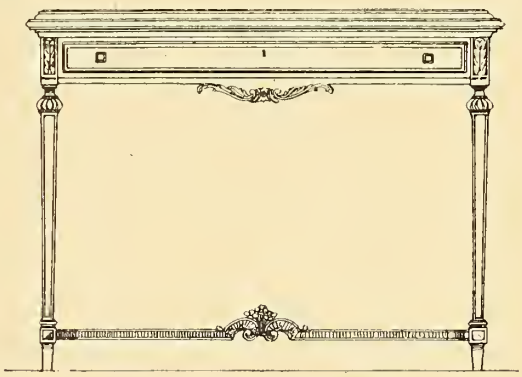
Cases, tables and chairs were invariably finished in gilt. Where ebony was used, the natural color was of course, permitted to remain. Sometimes when lacquer panels, imported from the East, were introduced, the balance of the case was finished to match the lacquer. The marquetry specimens of Boule and his contemporaries were finished in the natural color of the woods or metals used.

Dining-Room Suite

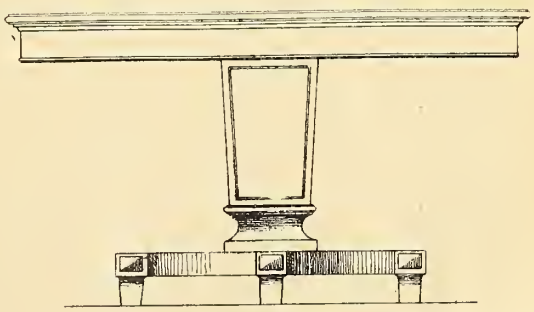
The sideboard, as shown, is six feet long, but this length can be adjusted to any size down to five feet, and the case should look equally well if care is taken with the proportions. The lower pairs of drawers on either side may be converted into cupboard space. This change, besides saving in cost, would be equally true to style.

The legs are square and tapered, being connected by an underframing which should be carved as indicated. The low back is appropriate and with the curtain section in the centre is provided with a very welcome color note. These curtain backs, by the way, are coming into favor and are likely to prove valuable selling factors. This should prove a very practical sideboard and will stand, in common with the rest of the suite, considerable modification without losing its Louis XIV. characteristics.

The side table, or serving table, may be reduced in length, but being of very simple design, should be left as shown. The low back in this instance has been simplified to a moulded strip and will prove quite sufficient. The china-cabinet provides ample space for



Side table or serving table.



Dining table made with pedestal.

its purpose. It is of such simple construction and design that it would be a difficult matter to further modify it.

While it is not strictly correct to give a pedestal

table for this period, the writer considers it advisable owing to the popularity of tables of this type with the public. Should the draughtsman wish to introduce a square table in its place it will be an easy matter to do so. The rim of the table might well be enriched with carving, but this would add to its cost.

The chair has been designed with the idea of preserving the features of chairs of this era and at the same time to produce a fairly cheap article. It is as simple as can be designed in this period and the upholstering and covering material represents the biggest expense. Care should be taken in draughting the arms of the arm-chair so as to get them of easy and comfortable curves. The back should rake about three inches in its full height. The carved under-railing means considerable work, but cannot be dispensed with if it is desired to have the suite truly correct to period.

From the drawings and sizes given and the description, any superintendent at all capable with the pencil and T-square should have little difficulty in preparing the necessary workshop drawings for this suite. The writer prefers not to give details of the construction, as methods differ in practically every factory, and these matters are best worked out on the drawing board.

Attractive Exhibits of Interior Woodwork

Illustrations of Exhibits of Manufacturers at Toronto Exhibition -- Excellent Opportunity to Impress Home-Builders with Quality of Products

Staff Article

The manufactured products shown at the Toronto Exhibition this year included some attractive displays of manufactured woodwork, the exhibits of interior finish, veneered doors, newel posts, and hardwood flooring, shown by Batts, Ltd., the R. Laidlaw Lumber Company, and the Seaman, Kent Company, being worthy of special mention.

The opportunity afforded to manufacturers at this exhibition of showing their products to prospective home-builders is an excellent one. Close to one million people visit the exhibition annually, and of these it is safe to say a large number are either planning to build a home or looking forward to the time when they will be able to plan one. Therefore, the manufacturer who has a full line of his products on display and who has a competent man on hand to point out the advantages of the different forms of construction and the qualities of the materials used is paving the way for future business.

The ordinary layman often has vague ideas about woodwork. He is liable to think that a veneered door is some kind of an imitation of the real thing. When the construction of one of these doors is explained to him, however, and he is shown that exposure to the weather cannot warp or twist it, he will begin to understand what a veneered product is. The qualities of the different woods, both hardwoods and softwoods, used for doors, stairs, trim, etc., can be explained. Then when the intending home-builder is ready to proceed he will be able to make an intelligent selection of materials.

Photographs of the exhibits of Batts Limited and the R. Laidlaw Lumber Company are reproduced here, but it is impossible for the camera to do them justice. Both of these exhibits were really handsome, and could not fail to produce favorable comment, even from those only remotely interested in woodwork.

Batts Limited were showing a varied assortment of columns for verandahs, pergolas, entrances for public buildings, etc., besides doors in numerous woods and finishes, grille work, quartered oak panelling, and a quartered oak staircase. This firm makes a specialty of columns, shipping them all over the country. One of the features of the exhibit was a pergola erected with columns and crosspieces with bandsawed ends. These constructions are rapidly finding favor for lawns and gardens. With vines trained over them they provide an excellent shady nook for a hammock or for serving tea out of doors.

The exhibit of the R. Laidlaw Lumber Company was very artistic. At one end was shown an entrance-way, built up with columns, frieze, and cornice. The materials for this entrance-way were manufactured by the company for a public building at Port Hope, Ont. This piece of work is shown in the photograph. The other side of the exhibit, however, where the rest of the products were displayed, is not shown. The doors were hung in an attractive manner so that they could be examined by visitors. Samples of mouldings, trim, etc., were nicely arranged. One of the products featured by the company was beaver board. This material is being used quite extensively for panelling for interiors of offices and for ceilings. The R. Laidlaw Company were distributing samples of it and descriptive literature.

The product of the Seaman, Kent Company, Ltd., is hardwood flooring, and the quality of the materials made by them was well shown. The floor of their booth was laid with their own product, while sections of the wall space, panelled with birch and maple flooring, brought these materials agreeably to the attention of the public. The lighting arrangements were excellent, and showed the different grades of flooring to the best advantage.

The exhibits of the Seaman Kent Company, the R. Laidlaw Lumber Company, and Batts Limited were all together, just inside one of the main entrances to the Industrial Building. The variety of the products shown and the good taste in which they were arranged speaks well for the progressiveness of these firms.

Another product of the woodworking factory, shown right beside the exhibits just mentioned, was that of the Kasement Skrene Dore Company, of Toronto. The screen door manufactured by this company is worthy of the attention of householders. The illustration reproduced here shows the features of it. The stiles and rails are mortised and tenoned to provide strength. The company's representative demonstrated the strength by climbing up on the rails. His weight (and he was no featherweight) did not make the door sag.

This door differs from the ordinary screen door, in that it is attached outside of the casing and closes flat against the casing. This eliminates fitting. In the event of the casing being warped, a thin shaving can be taken from the stile, it being hollowed out to within a quarter of an inch of the edge for this purpose. The illustration shows this.

Another feature of the door pointed out by the representatives is that instead of using hinges, eyelets

Exhibit of Batts Limited, at Toronto Exhibition.

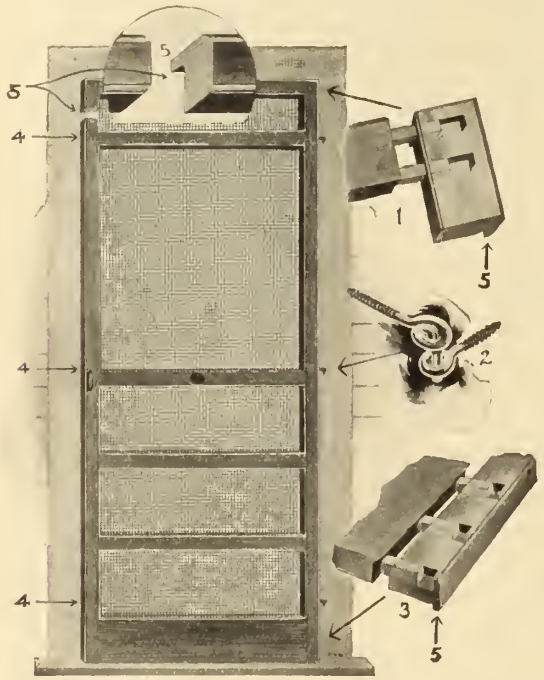
Manufactured woodwork shown by the R. Laidlaw Lumber Co., at Toronto Exhibition.

are screwed into the casing, and the pins, which are attached to the door, just drop into the eyelets. To hang the door it is only necessary to place it flat against the casings and drop the pins in the eyelets; to take it down it is just lifted off.

The McFarlane Ladder Works, of Toronto, were showing a full line of their products. These include ladders for a varied list of uses; also ironing boards, bake boards, clothes dryers, curtain stretchers, and a general line of woodenware.

The other exhibits that were interesting from a woodworking standpoint were those of the piano manufacturers. After viewing these piano exhibits, which occupy the entire two sides of the large building devoted to manufactured products, one is forced to the conclusion that piano manufacturing is one of the important industries of Canada.

Practically all the furniture shown was confined to the room displays of the retail dealers, like the T. Eaton Company, Ltd., Murray-Kay, Ltd., and the



New Type of screen door shown at exhibition.

Robert Simpson Company, Ltd. But there were some handsome pieces of dining-room, bedroom, and living-room furniture to be seen. All the rooms were tastily arranged with appropriate wall hangings, rugs, and tapestries, and in some cases panelled backgrounds. Two or three of the manufacturers of upholstered furniture, like Farquharson, Gifford Company, of Stratford, the Kindel Bed Company, Ltd., of Stratford, and the Kilgour Davenport Company, of Toronto, were

Burning Refuse Fuel in a Boiler Furnace

On taking over the direction of a wood-working plant, I found that the refuse burned in the boiler furnace was not sufficient and considerable coal was used with it for fuel. A bed of soft coal would be carried on the grates, and as refuse was brought to the boiler room, it was fired as needed. This decreased the coal fuel consumption, but clinker formed, air holes came in the fuel bed and excessive air entered through the fire-doors because of the frequent firing. Coupled with this, a blower discharged all sawdust into the furnace. This was also variable, allowing excess air at times. Summing up, the efficiency of the furnace was poor. These conditions led to experimenting, and having a proper storage bin for sawdust and a suitable place for refuse near the furnaces, I decided to let the refuse and sawdust accumulate until these receptacles were nearly full and then to burn it separately and obtain the best results from each kind of fuel.

The method employed for burning refuse was not desirable because, as it was shovelled into the furnace,

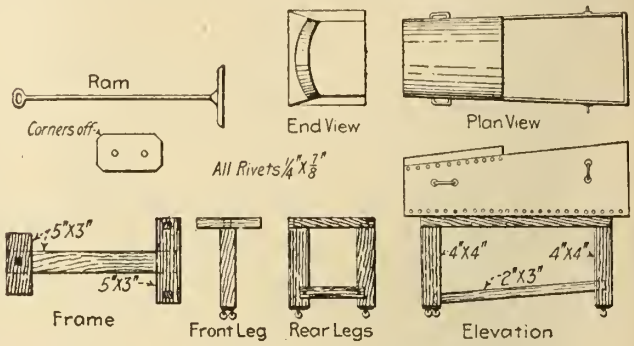


Fig. 1—Chute for feeding refuse into boiler furnace.

the fire-doors were necessarily opened several minutes and sometimes a drop of from 10 to 20 lbs. in pressure occurred. Coupled with this there was a considerable fire risk, as small pieces getting afire and dropping to the floor would sometimes fire the refuse heap.

The refuse consisted of bench shavings and sweepings from cabinet rooms, veneer in all woods and in a variety of sizes (some like wire grass, practically impossible to shovel), trimmings of heavier stock, also edgings and small wood from the mill, plus the sawdust. Some of the veneer had to be picked up by hand and thrust into the furnace mouth in bunches.

In order to charge sufficient fuel at one time to cover at least half of the grates, a chute of 3/16 inch sheet steel was made, as shown in Fig. 1. Each side was secured to the bottom by an angle iron. The top was held together by a metal hood, and the small end was made so as to enter the furnace door a distance of 2 inches. The frame support consists of an I-top with a front leg mortised, as shown, and a double caster fitted to its bottom. The two rear legs have a single caster each. These are held by two radial braces to stiffen them. Two ½-inch round-head bolts secure the frame to the body.

When about to fire, the chute is pushed back to the refuse pile and loaded. The fire-door is then opened, and the end of the chute is pushed in on the dead

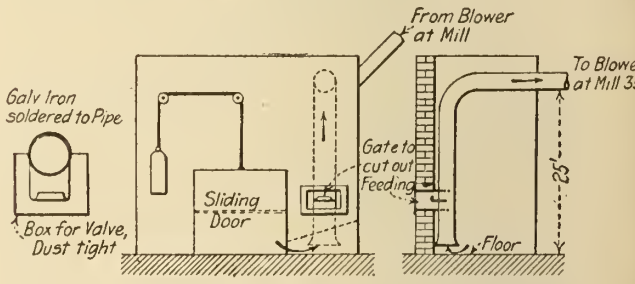


Fig. 2—Suction pipe from blower system to boiler room.

plate. A ram is made with its corners cut so as to clear the angle iron. It is used to shove the refuse from the top into the furnace first, otherwise some of the refuse would jam.

Sometimes, when there is a severe demand for steam, we keep the front end of the chute closed with refuse and the remainder partly filling, feeding gradu-

ally until the grates are full. This has given excellent results.

I next decided to connect an 8-inch suction pipe from the system in the mill to the boiler room and down inside a bin, as shown in Fig. 2. A gate was also put in to cut out the supply when not desired. A wooden flare at the bottom prevented choking up. This allowed the feeding of sawdust alone and operating with a damper regulator, thus accomplishing a further saving. An almost constant steam pressure was maintained with the damper from one-quarter to three-quarters closed.

Checking up for a comparison as to the time the fire-doors were open with both methods of firing under the same conditions, all was in favor of the chute feeding system. As far as the labor is concerned, it is a little in favor of the stoker. Of course, the sawdust that accumulated had to be shovelled into the furnace as before. The total cost of the firing chute complete was $21.

The approximate evaporation per pound of fuel was with the old method, mixed fuel, 4½ to 6¾ lbs.; with the new method, all coal, 9½ to 10½ lbs. of water. No data are at hand to show what evaporation is obtained per pound of refuse fuel. We have made a reduction of 18 per cent. in the fuel bill in 8½ months' operation with the new system.—F. J. MacDonald, in "Power."

Exhibits of Machinery and Factory Equipment

Leading Firms Were Showing Their New Productions at Toronto Exhibition—Lines Shown Included Many Articles of Interest to Woodworkers

Staff Article

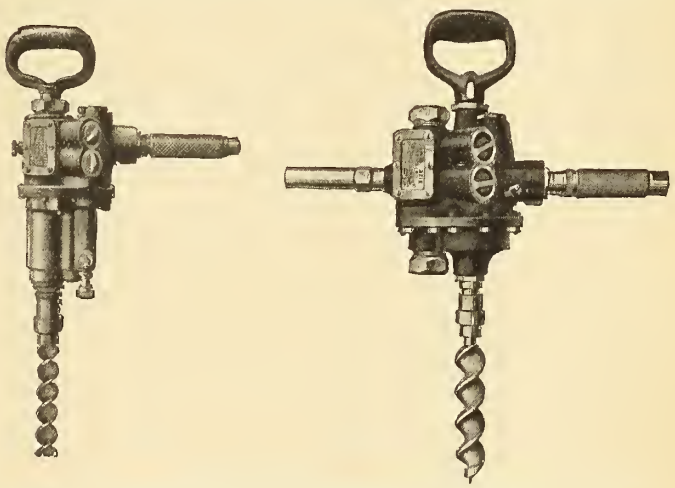
The lantern slide lecture given daily at the exhibit of the Garlock-Walker Machinery Company at the Toronto Exhibition was one of the features in Machinery Hall. The lecture dealt with the manufacture of machinery, from the mining of the ore till the machines are ready for shipment. The exhibit was visited by a number of manufacturers, plant superintendents, and mechanics. After viewing the many slides, which depicted the numerous operations and showed the amount of work involved in producing a machine with all parts accurately fitted, these men could hardly fail to go away without taking with them the impression that the machines in their factory or under their attention were worthy of the most careful treatment at their hands.

The Garlock-Walker Company carry a complete line of wood and metal working machinery and tools, and they had on exhibit machines representative of their line. They are the Canadian representatives of the American Woodworking Machinery Company, Rochester, N.Y.; the Lodge and Shipley Machine Tool Company, Cincinnati, Ohio, and the Falls Machine Company, of Sheboygan Falls, Wis. They also handle the pneumatic tools of the Thor Independent Pneumatic Tool Company.

Mr. Garlock, who devotes his attention to the woodworking machinery end of the business, regards the inside moulder and fast feed outside moulder, shown here, as two of the best woodworking machines that can be obtained. The No. 34-C inside moulder has the slip-on-head attachable bearing feature of an outside moulder or profiler. The company state that this machine is especially adapted to use in planing mills having large runs of stock moulding. The machine is built in two sizes, to work 12 inches and 15 inches wide by 6 inches thick. Both top and bottom heads are self-centering and detachable. The bearings on the operator's side are detachable. The top and bottom spindles are 2 3/16 inches in diameter where the heads go on. Boxes are side clamping and are oiled by means of chambers with circulating wicks. Both heads are driven by 6-inch belts, and automatic tighteners are provided for both.

The feed works consist of four rolls driven by heavy gearing. Power is transmitted direct, no expansion gears being used. The top rolls lift together by the aid of a single hand wheel and pressure is given by coil springs with adjustments for light or heavy work. The rates of feed are in a series—three to each, and two series are regularly furnished, giving rates of feed required. A lever which shifts an intermediate pinion in the gear box controls the rate of feed for each series and each series carries a change of pulleys.

The American Woodworking Machinery Company

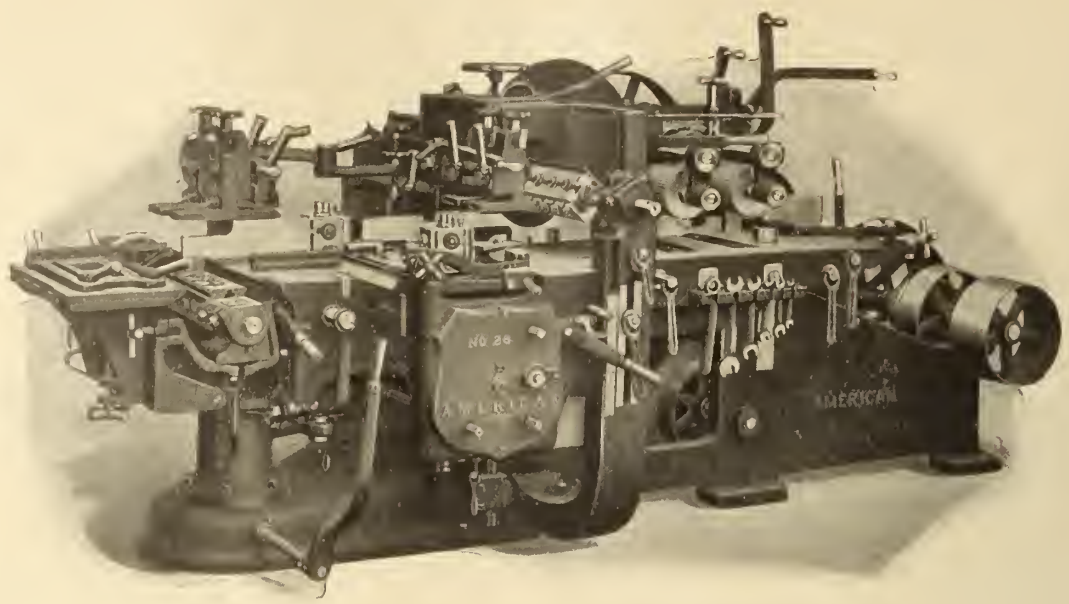


Pneumatic drills made by Thor Independent Pneumatic Tool Co. These tools are being used extensively for shipbuilding.

state that their No. 26 fast feed outside moulder has been developed by them owing to the demand for increased production from moulding machines which arose from the success of the fast feed planers brought out by them a few years ago. The No. 26 is made to work 10 inches and 12 inches wide. The 10-inch machine carries 4-inch side heads and the 12-inch machine 5-inch side heads. The bed drops 12 inches and the rates of feed are from 20 to 100 lineal feet per minute by change of pulley on feed countershaft.

The feed works consist of four rolls 6 inches in diameter driven by two cut gears which run in oil, and a steel roller chain. The top rolls are provided with outside bearings which are removable when changing from fluted to smooth or spur rolls. The top rolls may be lifted by a lever convenient to the operator to admit of placing forms, setting knives and backing out stock when necessary.

Round or square heads can be furnished, but an ad-



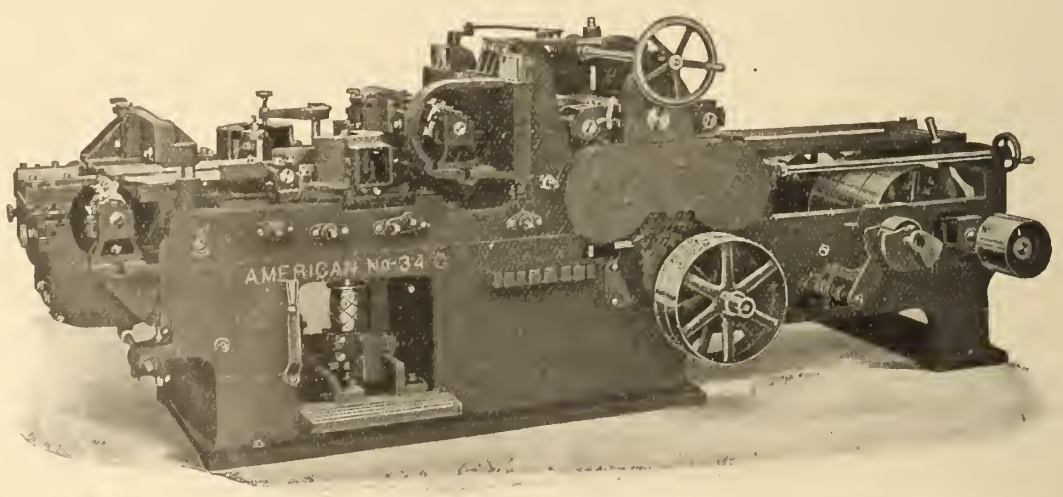
American No. 26 fast feed outside four sided moulder.

ditional price is charged for the former. The normal cut swing of all heads is 6¼ inches in diameter. The maximum swing of top head knives is 11 inches and bottom head knives 8½ inches. The chipbreaker is adjustable 2⅜ inches for extension of bed. A self adjusting tightener is provided for the top head to take up the slack in the belt. A feature of this machine as pointed out by the company, is that conical sleeves for accurate centering can be obtained for either round or square cutter heads when so ordered. With these sleeves any wear on the arbor or in the bore of head is compensated for and heads may be changed often or laid aside for a period of time and will always be accurately centered when used. The boxes are the self clamping and self oiling type and the outside bearings are detachable for changing heads.

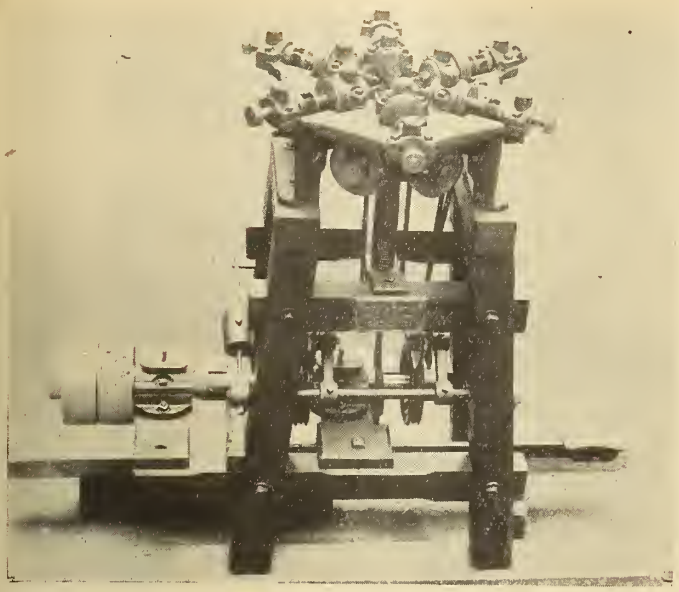
Cowan & Co., of Galt, Ltd.

Cowan & Co., Ltd., of Galt, Ont., were at their old stand in Machinery Hall. They had on view their power feed rip saw, chain mortiser, and box makers' cut-off saw. This latter machine has proven very popular with the trade, and a great number of them have been sold during the past year Cowan & Co. have been very busy almost since the inception of the shell box industry in turning out special machines and tools for shell box work. These include boring machines and special machines for manufacturing the diaphragms for the Bethlehem shell boxes.

The accompanying illustration shows a boring machine that was built by Cowan & Co. for a toy manufacturer. This machine bores six holes at once, and is used principally for boring the spoke holes in hubs for



American No. 34C inside moulder—Garlock-Walker Machinery Co., Toronto, are selling agents.



Special machine built by Cowan & Co. of Galt, for toy manufacturers. Bores 6 holes in wheel hubs at one operation.

small wagons and carts. The machine is shown here without the table. The table goes on top of the machine and the pieces to be bored are dropped down in front of it. The table does not interfere with the operation of the bits, as they work underneath it. The six holes are bored instantaneously at one operation.

Canada Machinery Corporation

Another interesting exhibit was that of the Canada Machinery Corporation, Ltd., of Galt, Ont. This firm had on view a number of machines of special interest to the woodworking trade. One of these is their No. 611 straight edging and jointing machine. Stock can be ripped and jointed on this machine and then glued without any further touching of the joints. Their No. 626 mitre saw attracted some attention. This machine is designed for furniture factories and other shops where quick mitering is desired. It is fitted with two saws, and both ends of the stock can be mitred at one time.

The company also had on exhibit their new type three drum sander. This machine will take stock 42 in. wide. The drums are on top, and the paper is attached by the company's own spiral method. The bed is of the revolving type, with rubber cushions to avoid marking the stock. The bed is automatically oiled while the machine is in operation. It is also automatically cleaned on the inside and outside by special brushes, thus keeping it free from dirt at all times. The rubber vacuum cups on the revolving bed grip tight enough to prevent stock slipping.

The bed can be filled to its entire width, and is especially adapted for short stock. The company say that any slight variation in the stock does not affect the feeding apparatus, as this is taken care of by the rubber cushions.

Dodge Manufacturing Company

The Dodge wood split pulleys are well known to factory owners in Canada. This company were showing a number of their wood pulleys, finished and in process of construction. The way in which the pulleys are put together ensures good service in factory use. The best materials are used in their construction. Some scientific tests made a short time ago by Prof. Price of Toronto University showed conclusively that they are superior to iron pulleys.

The Dodge Manufacturing Company also had on view a number of iron pulleys, hangers, and other transmission accessories.

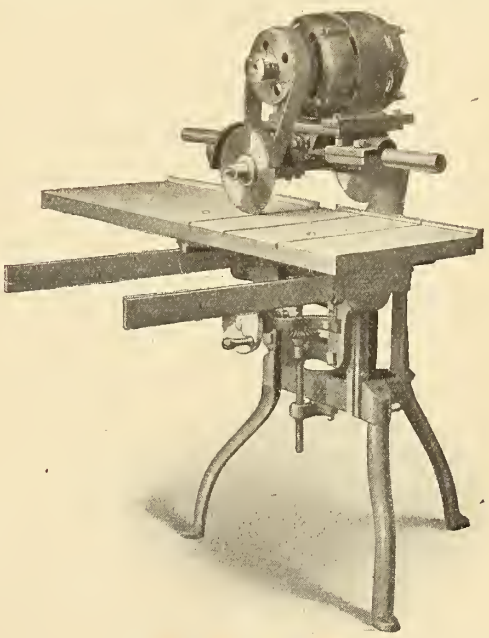
Preston Woodworking Machinery Company

A ball-bearing shaper, variety saw, and band-saw made by the Preston Woodworking Machinery Company, of Preston, Ont., were shown at the exhibit of the A. R. Williams Machinery Company. These machines are very popular among woodworkers, especially the ball-bearing shaper. The Preston Company have recently given some attention to the machines required in the shipbuilding industry, and have placed on the market an adjustable ship band-saw. This machine can be had for either hand feed or power feed. It can be turned to cut at an angle of 45 degrees to the left and 10 degrees to the right. In view of the activity in the wooden shipbuilding industry this machine should be much in demand.

Elliot Woodworker

Elliot Woodworker Ltd., were showing their new No. 5 machine, together with their pony woodworker and floor sander. The new No. 5 machine, with the 1¾ h.p. motor, is proving very popular. This machine will cut 5 in. oak, as a demonstration proved to a number of those interested. The No. 5 machine will do almost any work required on a building, such as dadoing, routing, Five of these machines were sold during the two weeks of the exhibition.

The pony woodworker made by this company is also a very useful machine. The motor is about 1 h.p. The saw mandrel can be tilted vertically and the machine used for shaping, tenoning, grooving, etc. The company claim that the whole machine can be put in a carpenter's tool chest. It is very serviceable, however, and will cut stock up to 2 inches thick, and will house stair stringers, bore, groove, plow, rip, cross-cut,



Elliot pony woodworker.

and do any other work that the contractor requires around a building, the same as the No. 5 machine. The pony woodworker is shown here. It is also shown in the company's advertisement elsewhere in this issue, where it is set up for various operations.

THE CHAPMAN DOUBLE BALL BEARING CO. of Canada LIMITED. Toronto.
BALL BEARINGS FOR ALL PURPOSES
TRANSMISSION BALL BEARING CO. Buffalo.
ELLIOT WOOD

Exhibit of Chapman Double Ball Bearing Co., at Toronto Exhibition. Note the "tank" in the foreground, revolving on "Chapman" bearings.

The A. R. Williams Company, besides their metal-working machines, showed the Eclipse planer, which has been handled by them for a number of years. They state that this machine will plane stock veneered with the finest veneer without going through the veneer. The machine can also be fitted with side heads, so that it will dress three sides of the stock or plane one side and groove the edges.

Chapman Double Ball Bearings

The exhibit of the Chapman Double Ball Bearing Company attracted a great many power-users. Manufacturers are particularly interested nowadays in reducing their overhead cost and are giving a great deal of attention to the power factor. The Chapman double ball bearings are showing wonderful results in numerous plants where they have been installed. These results are noticeable in the economy of the upkeep and in the matter of lubrication and atention.

The photograph shown here of the company's exhibit gives an idea of its attractiveness. The "tank" in the foreground attracted a great many people, while power-users were more directly interested in the bearings, hangers, loose pulleys, etc., on view.

Valves and Steam Specialties

The accompanying illustration shows the attractive exhibit of the James Morrison Brass Manufacturing Company, Toronto, who manufacture a full line of valves, gauges, pressure recording instruments, and steam specialties of all kinds.

Shurly, Dietrich & Co.

This company showed a full line of saws for the various branches of the woodworking industry. The exhibit was arranged so as to show the company's products to the best advantage. There were circular saws, resaws, mitre saws, dadoing saws, band-saws, etc. The quality of these "Maple Leaf" saws is well known to woodworkers.

Steam Specialties

George W. Cole, Ltd., condensation engineers, Toronto, Ont., were showing their traps and steam specialties. The company recently issued a booklet, entitled "Steam Condensation," which is worthy of the

The James Morrison Brass Mfg. Company's exhibit, showing their line of valves and steam specialties.

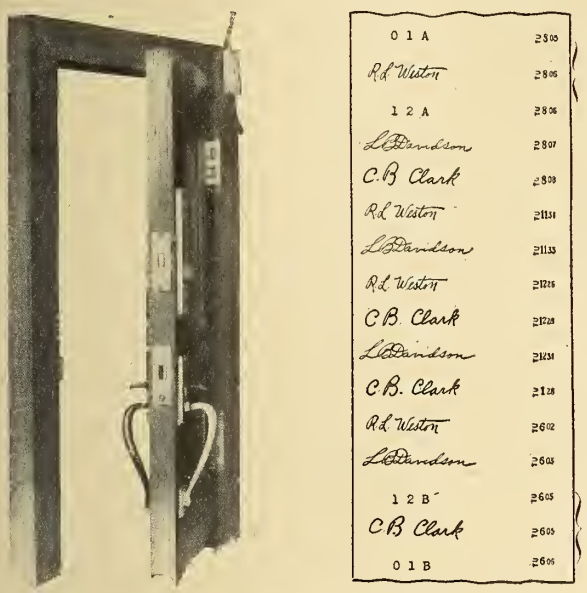
attention of engineers and superintendents who wish to know whether they are getting the full measure of efficiency from their boilers. The book is written by William H. Rose, a consulting engineer, and deals with the subject in an interesting manner. The information given is practical, but not too technical for the average man to understand.

Hutchinson Woodworker

The Hutchinson Woodworker Company, Ltd., of Toronto and Buffalo, exhibited their type 3 combination woodworker and jointer. This machine is built for the contractor, builder, interior finisher, picture framer, or the man with a small shop. It is equipped with a ½ h.p. motor, and is adapted for light work, such as cutting, ripping, boring for dowels, tenoning, dadoing, etc. The machine can be operated from any lighting circuit by attaching a plug to the socket and turning on the switch.

International Time Recorders

The International Time Recording Company of Canada, Ltd., were showing a complete line of time recorders, including a new device which can be attached to the office or factory door to keep tab of the



Something new in a door lock.

time employees and members of the staff enter and leave.

This new door lock is illustrated herewith, together with a chart showing the record that can be kept of the time each party passed through the door. Each key is numbered, and the time of entering and leaving is recorded by a clock located at a convenient place in the office or factory. Besides being able to tell who opened and closed the door, the employer can tell whether the key was used from the outside or the inside.

On the chart the numbers at the top indicated by the bracket show that key A opened door No. 1 from the outside on Tuesday at 8.05 a.m., that R. L. Weston held it, and that at 8.06 a.m. he opened door No. 2 from the inside.

The other records show the arrival of employees, their departures during the day for lunch, and the time of their departure at the end of the day.

The records at the bottom of the chart, shown by bracket, show that C. B. Clark, the clerk carrying key B, closed door No. 2 from the inside at 6.05 p.m. and door No. 1, as shown in the final record, at 6.06 p.m., from the outside.

Dowels and Wood Turnings

The Toy Products of Canada, Ltd., Farm Point, P. Q., had an interesting exhibit in the Process Building. Besides their line of wooden toys they showed the material from which they make dowels and wood turnings for the furniture and allied trades. This material is got out in square strips ready for the dowel machine. They were also showing some birch logs, right from the woods with the bark on, this being the principal material they use in making their product. The company has their own timber limits in Quebec, adjacent to their factory, from which they secure their birch logs.

Central Station Uses Refuse Wood for Fuel

In the report of the "Committee on Progress" of the N. E. L. A. is given a short description of a contract of unusual nature and of mutual advantage, being successfully carried out by the Oregon Power Company and the Booth-Kelly Lumber Company, of Springfield, Ore. The latter company operates a large sawmill and planing mill and, by means of conveyors and blower systems, transmits a portion of the refuse wood to the adjacent plant of the central station company. The power company pays $0.005 per kw.hr. at the switchboard to the lumber company for all energy generated, and the lumber company in turn pays $0.009 per kw.-hr. for the first 1,000,000 kw.-hr. for all over this amount. The contract further calls for a minimum usage on the part of each party to the agreement.

The steam required by the dry kilns, heating the offices and operating devices about the sawmill, for which electricity has not as yet taken the place of steam, is secured also from the Oregon Power Co. This steam is used in such quantities as to require an 8-inch pipe with boiler pressure of 150 lbs. to supply it, and is purchased at a flat rate of $45 a month. This appears to be a very low rate until it is understood that no account is taken of the fuel to generate this steam. In other words, the lumber company pays $45 a month for the use of the boilers of the power company and furnishes the fuel.

The average energy consumption of the lumber mill is about 8,500 kw.-hr. a day, and approximates daily 40 per cent. of the connected load, which was the load factor figured on when building the plant. In addition to this energy used by the Booth-Kelly Company, the central station generates for commercial purposes from 250,000 to 500,000 kw.-hr. per month. In the accounting at the end of the month the power company pays the lumber company from $700 to $1,200 after satisfying its account for energy used.—Power.

Women in Furniture Factory

The Canada Furniture Manufacturers, Ltd., of Woodstock, Ont., are employing about fifty women at their plant. The work on which they are engaged is sanding, polishing, packing, and waxing furniture. The management state that the women appear to be quite capable, and that, with the necessary instructions, they will be quite competent in a short time to hold their own with the male employees.

No man can be really successful who attempts to build his power of service upon dishonesty.

Practical Methods in the Furniture Factory

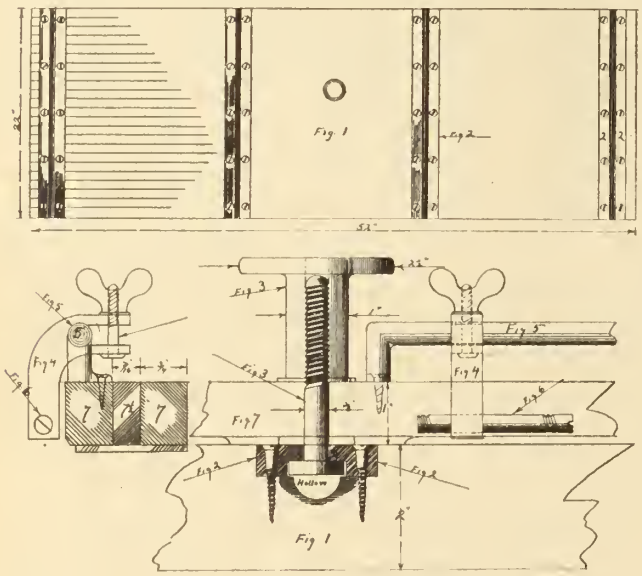
Continuation of a Series of Articles—Some Suggestions on How to Improve the Upright Boring Machine — Sketches Show a Useful Gauge

By W. J. Beattie

The upright boring machine is considered one of the more humble machine tools of the factory and on this account is not so frequently pushed into the lime-light. The cost in dollars and cents of such a machine is not large, consequently it remains in almost total eclipse. The usefulness of this machine tool is well known to all factory men, and they consider it an indispensable part of the equipment.

There have been very few improvements made on the upright or post borer; in fact so far as the machine itself is concerned, the attempt to improve on it has been negligible. The complete borer is turned out by the machine manufacturers, having a round hollow column, and the equipment comes ready to set up. Some manufacturers furnish the essential metal equipment, which is attached to a square wooden post. This is the more common type.

Why the effort to improve the capacity of upright



Gauge for upright boring machine.

single boring machines by having a power feed thrust that can be regulated for depth and speed, instead of the continual foot motion of the operator, seems an oversight. The foot pedal would necessarily always be included, but for large quantities of stock that call for thousands of holes, a day's work of pushing the foot pedal is a tiresome affair. With a power feed attachment a man would always be standing on both feet, and it is unnecessary to prove that he is in a much better and easier posture to expedite his work.

We will take the machine as it now comes from the manufacturer. The table is quite bare of any gauges or attachments that are sure to be needed. A strip of straight edged stick is used for a gauge and is held on to the table by a couple of hand or thumb screws. The stop blocks are likewise held to the gauge. If they are not placed correctly at once, they are tapped back or forward with a hammer, a very unsatisfactory method.

The accompanying sketch shows the table and gauges for an upright boring machine, that have been found in actual practice to be a big improvement on the old method. The top itself is made of strips, birch or maple glued up, buzzed true and planed to 2 inches thick, 52 inches by 22 inches in size, as Fig. 1. Across the top, as shown, are four dadoes, into which are let iron strips that have been rabbeted on one edge, Fig. 2. These strips are ¾ inch by ½ inch, the rabbet being ¼ inch. The boring is for 1¼ inch No. 10 screws. The bottom of the dado is hollowed, as shown. This is to make the removal of the "borings" easier, and an occasional hole bored right through the table, in the bottom of these hollows, is also recommended.

Fig. 3 shows the movable clamp that goes through the gauge, containing a ⅜ inch round-headed bolt, which engages the iron strips, making a positive and quickly adjusted clamp. The hand nut is 2 inches by 2½ inches, having a stem 1 inch in diameter, and tightened against a washer over the wooden gauges. It will be readily seen that this takes care of all transverse motion of the gauge. For the stops that the material is to butt against, Fig. 4, these are iron and are held on to the ⅜ inch iron rod, Fig. 5, by a wing nut clamp, which is made to release so as to slip along the rod. Should the stop not be set exactly when clamped, the adjusting screw, Fig. 6, is a very handy attachment, as it is threaded nearly its total length, and the thread must be snug so that no movement will take place.

The wooden gauge, Fig. 7, is made of two strips of maple, 1 inch by ¾ inch or 1 inch by 1 inch, having block glued between them (Fig. 7½) at the intervals where the iron strips, Fig. 2, occur. These blocks are 7/16 inch thick, which allows the ⅜ inch bolt, Fig. 3, to pass freely through. Clamp the glued gauge together between two pieces of straight stock, leave them until the glue is dry and the gauge will remain straight. If thin pieces ⅛ inch thick are placed across the bottom of the gauge when the blocks are glued, it will hold the gauge slightly from the table and so avoid the nuisance of the "dirt" getting between the material and the gauge. The ends of ⅛ inch sub blocks can be kept back a quarter of an inch, so that the gauge will present a working edge ⅛ inch above the table.

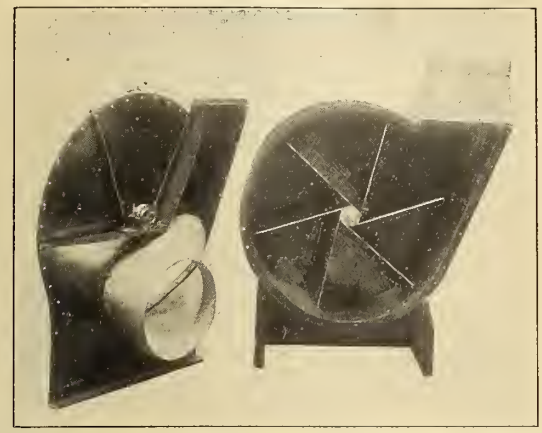
It will readily occur to the practical mind that Fig. 3 can easily be used for holding stop gauges on any part of the table. These can be made according to requirements and kept handy for use. For the boring of material that projects over the ends of the work table, and is only occasional, a gauge after the idea of Fig. 7 can be used, having a non-adjustable stop at the end and doing the necessary shifting with Fig. 3.

The most important feature is the time saving one. Hand and thumb screws have a peculiar habit of wandering around and the time spent in looking for them is a loss. Therefore, it certainly pays to have your boring machine table quite independent of predatory borrowers.

The writer expects to make some suggestions about the radial boring machine in an early issue of the Canadian Woodworker.

Modern Blower Systems

The Toronto Blower Company, 156 Duke Street, Toronto, are well known to readers of the "Canadian Woodworker" through the excellent blower systems which they furnish. They manufacture everything required in the installation of a modern exhaust system, and they furnish skilled mechanics for the work of installation. The "Foster" blower is one of this company's principal products. This fan is of unique design, being a non-centre suction fan. Instead of a centre circular inlet, it has a segmental opening to the rear, immediately adjacent to the discharge duct. The fan wheel is so constructed that the material entering the fan is immediately discharged, without passing through or around the wheel, and they claim that it handles every conceivable material, wet or dry, without clogging; also that it is always in perfect balance. The "Foster" fan has three bearings, shaft extending through, with bearing on the inlet side, thus eliminating the overhung wheel, and avoiding heating, clogging, and shaking. This blower is specially designed for handling shavings, sawdust, excelsior, etc. The Toronto Blower Company also manufacture a complete line of fans, galvanized iron pipe, dust collectors, auto-furnace feeders, hoods for woodworking machines, buffing and polishing wheels. They have had many years' practical experience, which has enabled them to evolve efficient and correct designs for their various products. The company will send an expert engineer of wide experience to inspect plants where installation of exhaust systems is being contemplated, or where alterations or repairs are under consideration.



Side view of 35-inch "Foster" blower, with front side removed, showing fan wheel in position.

Wood-Working Machinery

According to the British Chamber of Commerce Journal, Peru offers a considerable market for small woodworking machinery. There are many small furniture factories where a part of the work is done by machinery; some of these are already equipped with light, electric-driven machines, but more might be. Most of the machine tools now in use are of Belgian and German manufacture.

It is stated that discarded moving picture films are used for manufacturing varnish for aeroplanes. This varnish is said to be entirely waterproof.

Will Repair Machinery

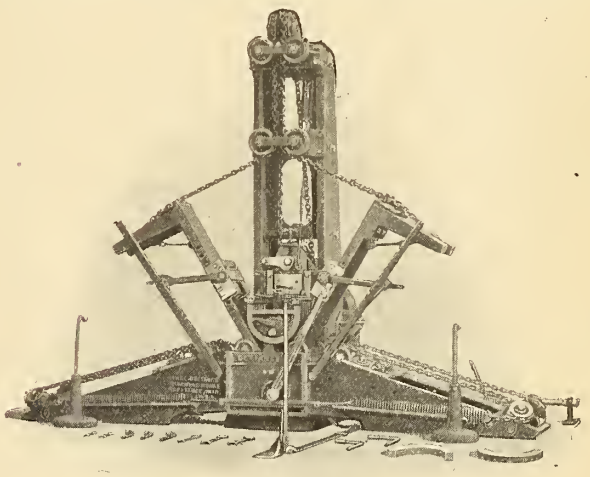
The Garlock-Walker Machinery Company, 32 Front Street West, Toronto, who are well known to the woodworking trade of Canada, have purchased the plant of the Hunter Engineering Company in Toronto which they will use for the purpose of making machinery repairs. This repair work will be in charge of W. E. Kells, a competent mechanic who was with the American Woodworking Machinery Company of Rochester, N.Y., for a number of years.

The Garlock-Walker Company state that they have received a great many communications from manufacturers from time to time asking them to do repair work. They will now be able to take care of this work. This innovation will no doubt be appreciated by manufacturers who have found it difficult to have repair work done.

New Steering Wheel Rim Bender

A new steering wheel rim bending machine recently brought out by the Defiance Machine Works, of Defiance, Ohio, and illustrated herewith, affords a new and economical method of bending steering wheel rims for automobiles, motor boats, and aeroplanes. It is arranged to receive and bend eight half rim strips at one time, in a single operation. The company state that during an actual test in a steering wheel rim factory this machine bent half rims at the rate of 5,000 to 6,000 in a day of ten hours, which is equivalent to 2,500 to 3,000 complete rims, this being a considerable increase in production over bending methods used by steering wheel manufacturers heretofore.

Another feature of the machine is the saving it effects in timber. It is said to save from 25 to 40 per cent. in stock by permitting the rim strip to be cut close to size, and on account of no lapping of ends and the fact that there is no warpage to allow for in the shaping of the jointed rims.



Machine for bending steering wheel rims.

The Defiance Machine Works advise us that although this machine has only been before the trade a short time, arrangements have been made for installations in nearly all the leading steering wheel factories. It is built to be used in connection with the Defiance Rim Mitering & Equalizing Machine, Rim Shaping Machine, and Rim Scraping & Polishing Machine.

Upholstering and Trimming

Chesterfields and Stuff-Over Chairs

By W. D.

Canadians should be grateful to their English cousins for the luxurious Chesterfields and stuff-over chairs which are rapidly becoming so popular in this country. To the writer's mind they represent the last word in comfort and good taste. Upholstered in tapestry, they fit into the general scheme of furnishing of almost any living room, providing the room is of sufficient proportions to show them to advantage.

The wide, roomy seats, with deep cushions, the roll of the arms, and the back upholstered in keeping with the rest of the chair, provide the acme of comfort. This class of furniture, typically English, shows in some measure what a luxury-loving people our cousins across the sea are. This stuff-over furniture is fast superseding the leather upholstered, fumed oak furniture for living-rooms and sitting-rooms. Leather furniture is always cold, and is far from being as comfortable as tapestry, velour, or other fabrics. Then the scarcity and high cost of leather has practically taken it off the market. Most of the leather used in Canada for upholstering was formerly imported from the United States, but the 7½ per cent. war tax which it is now necessary to pay, in addition to the duty, has made it practically impossible for American leather firms to do business in Canada. There is still a large quantity of imitation leather used, but this is confined to the cheaper furniture.

Visitors to the midsummer furniture exhibitions at Grand Rapids, New York and Chicago state that leather-upholstered furniture has almost completely disappeared from the American markets, velours, cretonnes, tapestries, and denims having taken its place. This is partly due to the almost prohibitive price of leather, which has been brought about by the scarcity of that commodity.

In connection with the Chesterfields and stuff-over chairs mentioned previously, there is a line of these on the market which are cheap imitations of the real thing. They are smaller and of very cheap construction. The general appearance, however, is more pleasing than some of the monstrosities of chairs one sees in black imitation leather. My grievance is not against the imitation leather (although it is not particularly attractive in black), but against the style, or lack of style, of the chairs.

The last few years has brought about a decided change in the tastes of the Canadian people with regard to furniture. Importations of good pieces of furniture from England and elsewhere and the coming to this country of good designers has been responsible in a large measure for this. These designers have come both from England and the United States. The reason American designers are in the foreground is that they were quick to realize the possibilities of the English period styles in this country. They secured authentic pieces and adapted the styles to American conditions.

Canadian manufacturers and designers have followed the trend of furniture design in the United States, modelling their lines after those of the American manufacturers. Some designers in the United States have been advocating for some time that America should develop styles of furniture of her own. This is quite in order, and she is to be commended for striking out and creating something for herself, but the writer, for one, hopes that Canadian designers and manufacturers will not continue to copy their designs from the States.

The alternatives are to create styles of their own or stick to British traditions. Canada has sent approximately four hundred thousand of her young men over to England during the past three years. The people of England have received them with open arms, and with that hospitality for which they are noted have opened their homes to them. Canadian officers and men have been welcomed in the finest homes of England. Is it not possible that those four hundred thousand men, or those of them who are fortunate enough to return, after spending many months in English surroundings, will bring back with them some well-developed tastes for good furniture? Will they again be satisfied with cheap imitations? A very large majority of these men will be getting married and furnishing homes after they return, and these questions are worthy the attention of our designers and manufacturers. The writer is a Canadian born and bred, but he would like to see British ideas in furniture and furnishings prevail in this country.

Frames for Stuff-Over Furniture

The growing popularity of stuffover work is one of the most notable features of the upholstery trade, says a writer in the Cabinet Maker. If inquiry were made with regard to this preference on the part of the public, the reasons given might be summed up in the one word, "Comfort."

Take the gent's chair of "a suite," with its almost upright back, two small arm pads, and a seat which, if a reclining position be adopted, soon means a backache, and compare it with the modern "divan easy," consisting of a large, roomy seat, full stuffed arms, sloping back, with the full swell at the bottom which is so necessary for real comfort, spring edge, arms, and back; no unbiased observer can deny that the stuffover chair is the more inviting and comfortable piece of furniture.

Again, take the old-fashioned couch, placed so rigidly against the wall, with its open back and long pad, and contrast it with the modern chesterfield, which looks well in any position, and is frequently fitted with a drop end for extra comfort. The chesterfield allows of plenty of room for cushions—which impart a finishing touch to all stuffovers—and the occupant can recline at ease, as there are none of the awkward projec-

tions of the framework so often found in the "suite" couch.

As far as "smalls" are concerned, the very adjective by which they are described calls attention to their in-

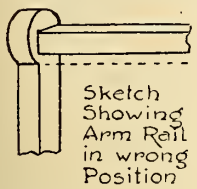


Fig 2

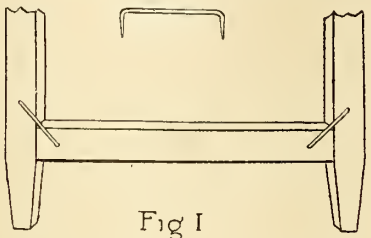


Fig 1
Frame braced with Iron Dogs

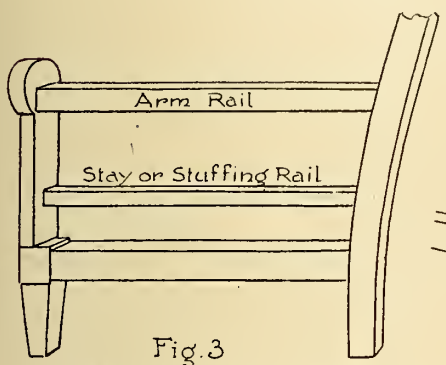


Fig. 3
Correct Position of Rails

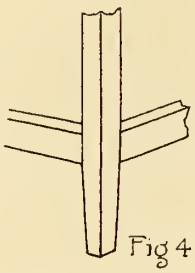


Fig 4

Showing construction of frame for stuff over furniture.

herent defect, viz., lack of seat room and consequent lack of comfort. Price-cutting has played a part here, and some "smalls" are so diminutive in size, and light in construction, that they cannot be regarded as real additions to the comfort of any home.

Errors in Construction of Frame

The chesterfield and "divan easy" may be called the originals from which numerous other stuffover designs have been evolved, but these two original designs—doubtless because they conform to the requirements very closely—still remain popular. It is to be regretted, from the point of view of the practical upholsterer, that many stuffover frames are very poor in construction, and some upholstered furniture, reaching a high standard as far as outward appearance is concerned, once stripped of its expensive covering, reveals a frame with badly-fitting joints and wood which has never seen a spokeshave or plane. This is not as it should be. Upholstering is a skilled trade, and in the making of frames as much care and attention to detail is required as in the subsequent building up and finishing. There are many technical errors in the construction of modern stuffover frames that are irritating to the upholsterer, and which might be easily rectified even in the cheapest of frames.

The Use of Braces

Braces are most important for giving added strength, and should be used on all grades of upholstery frames. They are about 1½ inch thick, and shaped in such a way that screws may be driven in at right angles to the length of the rails, which the brace is used to support. Iron dogs are also used. They are easy to fix, obtainable in various sizes, and used as shown in Fig. 1. These iron dogs are also useful for strengthening frames needing repairs which are weak from lack of bracing, as they can be fixed without too much stripping of the coverings.

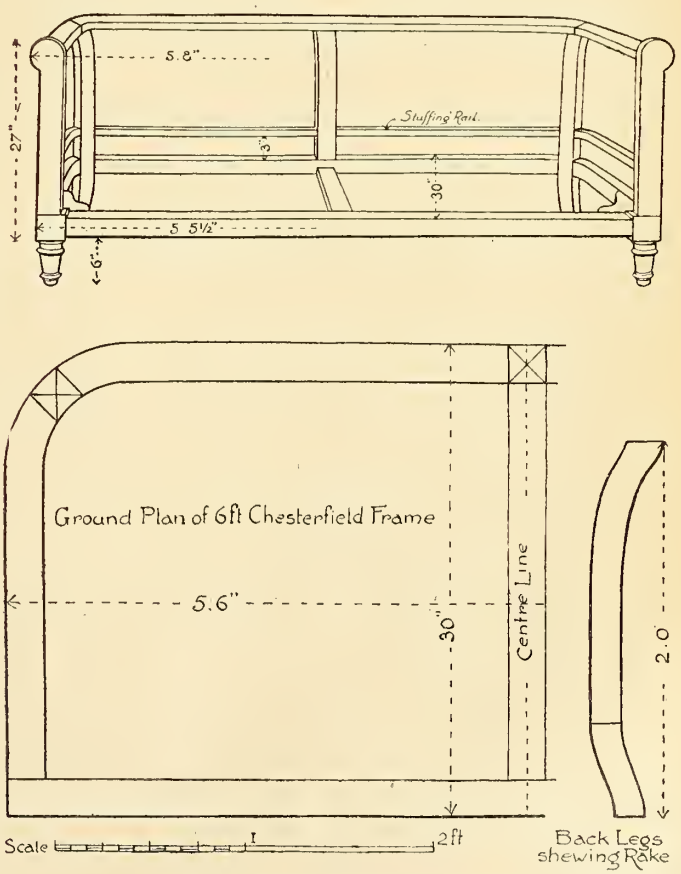
The best critic of a correctly-made stuffover frame is the upholsterer who has to build his work on it, and some errors of construction which effect his work adversely will now be described.

In stuffover settees or chairs the appearance of the outside of the arms is more noticeable than the inside, yet too often they are unsightly and irregular in finish, lacking the clean, direct line which one looks for in first-class work. This is frequently due to the placing of the arm rail too high in the front scroll, as shown in Fig. 2. The lower edge of this arm rail should be brought down to the level of the dotted line, otherwise it is well-nigh impossible for the upholsterer to maintain an even line directly underneath the arm. The same fault is sometimes found in the backs, and the unsightly and irregular surface of outside arms and backs is often due to badly-constructed frames.

The stay or stuffing rails should be sunk ½ inch to ¾ inch, to allow for the several layers of materials which will subsequently be tacked on them. In Fig. 3, both stuffing rail and arm rail are shown in their correct positions.

Importance of Regular Line at Base

Even a well-made chair may be ruined by inattention to minor details, for fine upholstery in the last resort consists of beauty in the finished lines. For instance, the braid or banding should present a regular line all round the base of the stuffover chesterfield or chair. In frames in which the legs are not dowelled on, such as those with taper legs, as shown in Fig. 4, there is no guide by which the upholsterer can keep his line uniform when working on the leg itself. A man with a good eye will keep a regular, horizontal line, but careless workmen will fail to do so. This sometimes causes an unsightly corner.



Plan and elevation of Chesterfield frame.

Letters to the Editor

Future of Passenger Car Industry

Editor Canadian Woodworker:

Having received your monthly magazine through the firm where I am employed, it is with a great deal of interest that I read various articles from time to time on how to run a shop, how to handle men, how to buy the best machines, and many other why's and wherefore's pertaining to the woodworking industry, but never have I seen an article in regard to the woodwork in the passenger car business or anything pertaining thereto.

I have been employed with two of the larger manufacturers in the United States and have had the benefit of the experiences of men who have made a life study of this kind of work, and it would therefore be of interest to me to know what the future possibilities for our Canadian firms along this line are or might amount to.

Since 1914 things have been at a standstill and the importation of mahogany and other fine veneers and lumber for cars of this type have been very limited, but being of an optimistic turn of mind I look forward to an extensive portion of this work to follow the war. The prices to be paid for rare hardwoods are almost prohibitive, but the scarcity of an article makes it attain the height of its value and I for one would like to see some of this high grade woodwork to the fore again.

I can recall when car partitions, buffets, side finish and bunk fronts had hundreds of dollars' worth of carving on each piece, but this class of work is now practically out of date, the flat and plain taking its place. In this particular kind of work there is still room to show the beauty of good cabinet-work by veneers properly matched and distributed throughout the car.

Being located in a beautiful central Canadian city, I believe it to be the best city in Canada for the building of a shop of this nature, either by the government or some private concern.

The remark was once made to me by the president of a very large and successful concern that there was very little profit in passenger cars, but that it was necessary to handle them in connection with the commoner cars or freight cars in order to get a just part of this work.

The point I aim to get at is this: we will have a great revival of business along this line eventually; therefore, why not keep it in Canada? Hundreds of returned men who are woodworkers could handle a part of this light work nicely and I cannot see any reason why the great percentage of it should be let out to the United States manufacturers. Their experience has made it possible for them to do this work cheaper than we can, but if we take hold of the proposition with a strong determination we should overcome most of our difficulties. My slogan is: "Preparedness.". Experience has taught us this.

We have now several firms who buy and sell hardwoods, and from my experience with them they can secure as good a line as our competitors. I would like to hear from some responsible source what our woodworkers can or might expect along this line, and therefore appeal through your magazine, which has found its way throughout this Dominion.

Friend of Woodworking Industry.

Salary for Cost Man

Editor Canadian Woodworker:

As a matter of information for future references, could you find out for us from some leading Ontario furniture manufacturers what they have to pay for a cost price man? In giving us this information, we shall be much obliged to you.—Quebec Manufacturer.

ANSWERS.—(1) Cost systems, as you are no doubt aware, are as varied as colors of the rainbow, and each manufacturer has a different conception of the purpose aimed at, and ideals to be reached through the operation of a cost system.

The three main purposes of a cost system are:

(1) To record transactions of the processing of materials from the stores room to the shipping room.

(2) To form a basis upon which action can be taken towards reducing production costs and eliminating waste.

(3) To form a source from which can be built up managerial reports for the purpose of directing and controlling the business.

Taking an ordinary factory of, say, one hundred men, after a system has been thoroughly installed by the aid of an expert, and a fairly good bookkeeper placed in charge we should say that a salary of $60 a month is sufficient if the purpose outlined above under No. 1 is all that the owners of the business desire their cost system to accomplish. If the scope of the system is to be broader and the operation of it is to become part of the policy of the management, so as to include the other two objects outlined above, the salary, of course, will be increased according to the amount of work desired and the amount of refinement in cost keeping necessary for its purpose.

There is much timidity among manufacturers regarding the installation of a cost system because of an unreasonable fear that this expense is additional to those already incurred. A furniture manufacturer employing, say, two hundred men and desiring to receive all the benefits of a thorough, up-to-date cost system should be willing to pay $100 a month for this work.

No. 2.—Re salary that we are accustomed to paying for men in charge of our Costing Department.

We may state that from $18 to $25 a week is the usual salary for the man in charge of this work, and, of course, his assistants would demand a less remunerative wage. We trust this will give you the information desired.

No. 3.—We cannot give you a definite answer regarding the salary of a cost man, as we are not conversant with the salaries paid by other manufacturers, but we are inclined to think that from $15 to $17 per week would be a fair average wage for the work you mention.

No. 4.—The salary of a cost man in a furniture factory around Kitchener is from $3.00 to $4.00 per day.

Wooden Guns for Drilling

The United States Government has ordered 6,000,000 wooden guns, made of black gum, for use in the training camps where troops are drilled. They will be copies of the regulation rifle. By using the dummy guns, the real guns will be spared much rough handling by the raw recruits.—The Barrel and Box.

Pigments, Driers and Thinners Used in Paints

Paint is used quite extensively in many woodworking plants and in some furniture factories for coating backs, interiors, and for coating the material that is to be finished in surface oak. It is always valuable for the finisher to have an accurate knowledge of the ingredients of the materials he is working with. For that reason we believe the following extracts from an address delivered at Philadelphia by G. B. Heckel on the materials used in the manufacture of paint will be interesting:

Paint, as you know, is composed of two classes of ingredients—the solid portion, which is known as the pigment, and the liquid portion, which is known as the vehicle. The solid portion gives to paint its characteristic opacity, which differentiates it from varnish and other materials of similar character. Pigments come to us from divers parts of the earth.

It is usually my custom, in a talk of this kind, to begin with the liquid ingredients of paint. I wish to say, however, before entering upon these matters, that the paint chemist, who is seldom seen and less frequently heard, is a dominating potent factor. The paint factory without a chemist may try to make paint and try to "get away with it," but I would not like to be the manufacturer who attempts to compete in this way. Therefore, I think it is highly commendable that you devote a good portion of your time to the chemistry of the subject. Of course, chemistry is what makes paint "paint"; and it is important for the economy of the manufacture of paint in these days to be able to determine the chemical character of every ingredient which goes into it.

Take, for instance, a drier made with manganese dioxide. This is added to linseed oil to incorporate a certain percentage—say, 2 per cent.—of manganese in the oil. The quantity of manganese taken up by the oil depends entirely upon the acid content of the oil. Now suppose a paint manufacturer tries to make a drier without knowing the acid value of his oil and the combining value of his manganese. Unless he measures these items accurately in the laboratory before he attempts it, some of his manganese is going to be wasted.

The most important ingredient in modern paint manufacturing, of course, is linseed oil. From two to two and one-half million acres of land in the United States are devoted to the cultivation of flax for the oil contents of its seed.

Linseed oil is used in the manufacturing of paints simply because experience shows it to be the best and most valuable and most available oil for the purpose. Linseed oil owes its properties as a paint oil to the fact that it is an unsaturated hydro-carbon, and has, therefore, the faculty of absorbing oxygen from the atmosphere, which converts it into a rubber-like substance known as "linoxin." This action is accelerated by certain metal salts which act catalytically on the oil and hasten the absorption of oxygen.

The flaxseed is gathered by machinery on a large scale and shipped to elevators in Duluth and Minneapolis, then by rail or boat to Buffalo and the seaboard. The seed, after being properly scoured and cleaned of all foreign substances and dirt is first ground in rolling mills to a meal; then it is placed in a heater and subjected to the action of live steam to break up the oil cells. It is then run into moulds, by which it is formed into cakes. These cakes are wrapped in camel's-hair cloths and stacked between the plates of hydraulic presses, where the oil is expressed from them. The oil is then filtered, run into settling tanks, and, after settling, is sold as raw linseed oil. The cake is packed and shipped to Europe, where it is highly valued as cattle feed. It is a peculiar fact that linseed oil cake is one of the most important factors in the price of the oil in this country. When the cake market rises in Europe the linseed oil market falls in this country, and vice versa.

The second liquid ingredient of paint is the volatile thinner, and it is introduced not because it has anything to do with the quality of the paint, but simply as a mechanical aid in its application. The most important volatile thinners in use are turpentine and benzine, the latter being usually termed petroleum spirits.

Turpentine and other volatile thinners are introduced into paint simply for their mechanical effects. They evaporate and thus facilitate to some extent the drying of the material. It is obvious that if there is less oil to dry the oil won't take so long to dry. In the case of turpentine it is possible that it serves to some extent another purpose. It is believed to act as an ozonizer, according to the theory of French chemists who investigated the subject.

We are familiar with the prejudice of painters against benzine, and their strongly-expressed preference for turpentine. This attitude was justified when benzines were of the character produced in earlier days. But there is scarcely one justification for it to-day. The benzine which has the same boiling point and the same rate of evaporation as turpentine is to all intents and purposes as good a volatile thinner as turpentine. I think that one of these days turpentine is going to be very scarce and very precious; therefore, where we have at our command materials as good as turpentine, and in some cases better and always cheaper, why not use them? Or if their use introduces difficulties, why not strive to overcome the latter?

There is a very interesting product of paint manufacture which has come into use during the last ten or fifteen years. It may have been fifteen or more years ago when the first Chinese wood oil was brought into the United States. Some of it reached a Philadelphia man who had an office opposite mine. He received twenty gallons of it, and asked me what it was good for. Finally we took it to a varnish factory for testing. It was a very peculiar material. We started heating a few gallons and when we had raised it to 330 degrees we had a very fine jelly, with which we could do nothing at all. Since that time the chemists of Europe and

America have been experimenting with this oil, and the annual importation is now between five and six million gallons. It is known as Chinese wood oil or tung oil. It is produced by a tree which grows along the Yang Tse Valley, and is known to the Chinese as the Ying Tsu Tung, or "Apple Fruit Tung."

A peculiar thing about this oil is that it seems to have the property of drying simultaneously throughout. Anyway, it sets with a certain degree of hardness throughout, and does not "dry," like linseed oil, by progressive oxidization from the surface. It is safe to say that on the introduction of this Chinese wood oil depended probably the most important development of the paint industry in the past ten or fifteen years—the manufacture of flat interior wall paints.

The remaining liquid ingredient of ordinary paint is what we know as drier. Certain metallic salts, especially those of lead, manganese and cobalt, have the property of hastening the oxidization of the drying oils. The generally accepted theory is that they act catalytically. "Catalysis" is a rather obscure chemical or physico-chemical phenomenon, which we need not discuss here except to say that according to the best authorities a catalyser is a substance which, while apparently taking no part in a chemical reaction, by its presence accelerates the reaction which in its absence would proceed with great and sometimes with infinite slowness. The drying salts greatly stimulate the absorption of oxygen by linseed oil.

Driers, therefore consist of solutions of metallic compounds in linseed oil or other drying oils, being present usually in the form of oleates. Driers made with lead salts differ in their properties from driers with manganese or cobalt, and are selected according to the pigment combinations with which they are to be used. When the drier consists only of oil and metallic salts it is known as an "oil drier"; when a gum or gum resin is present it is known as "japan drier." The metallic salt is then usually present as a resinate.

The two lead compounds most commonly used are litharge and red lead. To produce litharge metallic lead is melted in open furnaces and subjected by suitable means to the long-continued action of the air. The litharge thus produced, when subjected in a similar furnace to the further action of air, is further oxidized into red lead. The red lead with which we are familiar contains from 5 to 15 per cent. of litharge, and is a better drier on that account.

The most important gum used in making japan driers is the kauri gum of New Zealand. It is a fossil gum, produced by extinct forests of the dammara Australis. The gum from the living kauri tree is very different from the same gum in the fossil form. The first resembles resin, the second amber. Long sojourn in the earth has slowly produced a remarkable chemical and physical change. What chemistry has done in the earth chemistry can undoubtedly do in the laboratory, and it has often struck me as strange that the process of transformation has never been worked out. There is little doubt that the decrease in supply will eventually tempt the organic chemists to solve this problem.

We now come to the pigments. Of course, the foundation-stone of the painter's industry is white lead. You can make excellent paint without it, but it is a very important material. We depend upon it for two things—first of all, to give opacity to the paint film; and, secondly, to see that the paint does not last too long. This last statement is not entirely humorous. White lead perishes by progressive crumbling from the surface, and the ultimate end of white lead, like that of man, is dust. It leaves the surface in good condition for the application of other coats. It is very important as a corrective for other ingredients which produce a harder film and tend to be more durable. Therefore, the paint manufacturer of to-day balances his ingredients against each other; the ingredient which gives opacity and the quality of not lasting too long is white lead.

Silica, another important inert pigment, comes to us in two forms—as silicious earth (the skeletons of fresh water diatoms) and as finely-pulverized quartz. These have different physical characteristics dependent upon the form of particle.

Many other pigments are used in paint manufacture, which time does no permit us to mention, excepting the important chromates—principally the chromates of lead. Chrome green is a combination of lead chromate and Prussian blue, precipitated to diffuse and brighten the color, on a large percentage of barytes. Prussian blue is an important pigment, and interesting because it contains the cyanogen radical—that peculiar compound of carbon and nitrogen so deadly in prussic acid.

Something About Shellac

The constantly-increasing use of shellac, not only in wood finishing but in many less familiar lines, gives particular interest to a brief description of the sources from which this important material is obtained.

First, we should understand the difference between lac itself and the gum generally known as shellac.

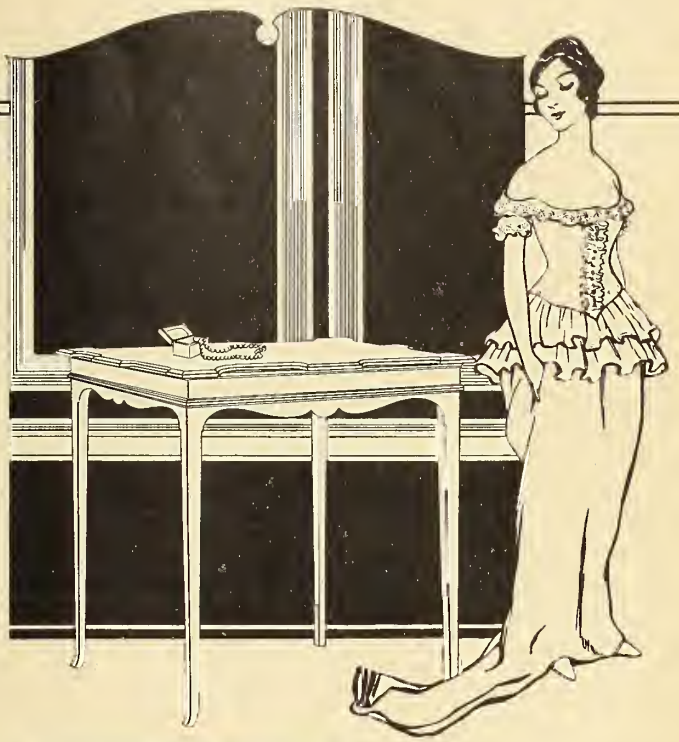
Lac is the raw material from which shellac is made. We see nothing of lac in its original state. It comes to us after being put through a process of manufacture, the result of which is our shellac gum.

Lac is an incrustation formed on the twigs and branches of various trees by an insect known as tachardia lacca. The gum is almost wholly a product of the forest of Northern India; that is, Eastern Bengal and Assam, and the northern portion of the neighboring section of Burma. Lac has also been found in Ceylon, Siam, and China, and in some of the islands beyond the Peninsula of Lower Siam, but these territories do not yield enough to invite exploitation.

The lac insects are of a dark reddish brown color, and when full grown are only about one-fortieth of an inch long. They swarm twice a year in great numbers. The females, which outnumber the males about twenty to one, attach themselves to the trees by piercing the wood with their beaks, and draw out the sap. This is given out again from their bodies, and forms an exudation which solidifies on exposure to the air. Thus the body of the insect is eventually enveloped in a hard, shell-like covering, which substance is known as lac.

Within the protection of this cell the female lays her eggs and dies, and the young are hatched and work their way out through the protecting crust. Untold millions are bred at each evolution, and the supply of lac would be vastly greater except that a large percentage perishes through exposure or lack of nutriment.

When the lac has hardened on the trees the branches are broken off by native laborers and gathered for the manufacture of shellac. There are two generations of the insect a year, and consequently two principal periods for gathering the gum—the April and November crops. The April crop is called the "bysacki" and that gathered in November the "koosmi."



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There are smaller crops in some seasons, in July and September, which have little effect on market prices, but are of importance for the high quality of the yield. The finer marks are made almost exclusively from the small crops.

The broken twigs and branches are carted in large quantities to the nearest shellac factory, and are first put through the grinding mills.

The process of washing the gum is carried on in stone vessels about the size of an ordinary wash-tub. The washers tread the gum with bare feet, and force out remnants of wood and similar particles and remove the greater part of the lac dye. This dye was formerly a product of great value in many industries, as it gives a beautiful full red tone, and is practically non-fading. It has in later years been entirely supplanted by colors made from coal-tar products.

When the gum has been washed it is spread out to dry, and is then again carefully sifted and freed from remaining impurities.

Various qualities are now graded according to color, melting point, etc. Each factory has its favorite marks, which are carefully standardized by experts in this line.

The lac is next melted and sheeted, and emerges in the form of shellac. It is then ready for shipment.

The melting process is necessary to give uniform thickness to the flakes. Long, narrow bags are used in this work, and in these the raw product is tightly packed and suspended over a charcoal fire. As the lac melts the bag is twisted, and the gum, in semi-liquid form, comes through the cloth. It is scraped off, spread over large flat stones, and pressed down to the same thickness over the whole surface. In this way it coalesces and cools.

After being reheated to a point of flexibility, the sheets are stretched by hand to give the thin texture of the flakes with which we are familiar, and these are broken and packed in cases and bags.

The percentage of what we would call efficiency is very low in India. The laboring day is twelve hours, yet it is estimated that nearly 200 laborers would be required to turn out shellac at the rate of one ton per day.

"T. N." of the United States standard, is the most popular brand of orange shellac, and in the quantity used far exceeds all other marks combined. Other well-known orange marks are "D. C.," "V. S. O.," "Diamond I," etc.

Bleached shellac is a product of domestic manufacture. It has exactly the same qualities as orange shellac, from which it is made, but it is bleached to a yellowish white. Not all of the orange color can be removed through bleaching, although bleached shellac in solution shows practically no orange tinge.

The cases and bags in which orange shellac is imported contain, as a rule, 165 pounds, the equivalent of the East Indian weight of two maunds. The world's consumption is figured as 250,000 of such packages per year.

Shellac is increasing in the diversity of its uses, and, aside from the large amounts required for wood finishing of every kind and for the manufacture of lacquers, it has become an essential in many rubber compositions, cements, sizings, stiffening pastes, and is extensively used for hats, shoes, electrical goods, telephone receivers, insulation, phonograph records, buttons, dominoes, sealing-wax, and for the manufacture of leather dyes, polishes, and preservatives.—The Decorators' and Painters' Magazine.

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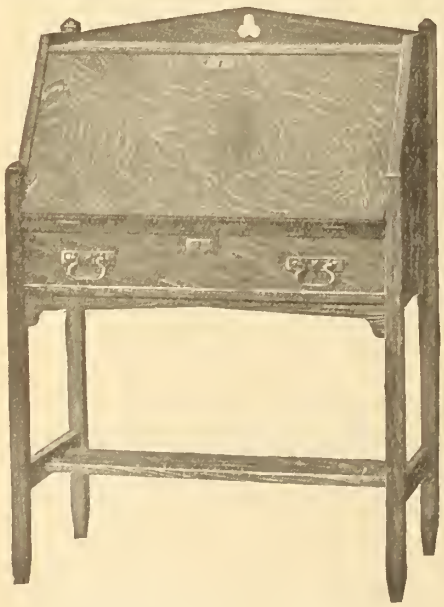

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Veneers and Panels

Removing Trouble from the Veneer Room

By M. R.

The veneer department of the modern furniture and piano factory presents problems that are not found in other fields of industrial activity. Also the veneer department calls for a higher order of intelligence than is usually found in the more common fields of manual labor.

The trouble at present is that a large number of veneer users are wholly unconscious of the fact that the proper use of veneer presents problems of such depths that they simply cannot be solved by the mind which has not been trained to think. Even in some large plants, with up-to-date equipment, cheap help is employed, the management apparently thinking that they are saving money. Veneered products in many forms are now finding popular favor with the general public, and the future of these products is such that manufacturers cannot afford to take a chance on turning out cheap work.

They should, therefore, make the strongest possible efforts to get men for their veneer departments who will apply themselves and do some real thinking. It has been the writer's experience that it is often better to get a green man and break him in on veneering than to get a middle-aged man who has worked all his life in a veneer room. The latter generally knows all there is to know about veneering and, consequently, cannot be told. In reality he has very little knowledge of veneering. He does not know why anything is done, but simply does it because it was the fashion when he learned his trade. It is only recently, comparatively speaking, that the trade papers have been trying to inculcate scientific methods of doing veneering, and unless you can get hold of a man who has not been on veneering long enough to get into the rut you are generally better off to get an outsider.

I do not mean to say, of course, that all the old-time veneer men are in a rut. There are lots of good, live fellows among them, but if you are picking a man to take charge of your veneer department it pays to study them and have a few good talks with them before making your decision.

Troubles with veneered work can generally be traced to the veneer room, despite the fact that the foreman always tries to put the blame on the finishing room foreman for the "dope" he puts on. This see-sawing of the two departments is pretty nearly worn out now. The live superintendent of to-day does not walk away in disgust, leaving the foreman of the finishing room and the veneer room foreman wrangling over who was to blame; he gets busy and traces the fault down by making observations and experiments.

When he has the evidence collected he calls the foreman of the responsible department into his office and proceeds to straighten matters out. If the bad work is the result of carelessness, he reads the riot act and gives Mr. Foreman to understand that he has to "deliver the goods" or some person else will. If the bad work is not the result of carelessness (and it is generally an easy matter to decide), then the foreman and superintendent discuss the various operations thoroughly, point by point, the superintendent offering suggestions or asking the foreman to make them. In this way the whole matter is cleared up and the blame placed where it belongs. Friction between the departments is eliminated.

Now for a few facts about the veneer room itself. I think I am safe in saying that only a few of the factories manufacturing high-grade furniture and pianos provide the proper facilities for their veneer department to turn out first-class work. Sometimes this lack of facilities takes the form of antiquated equipment and other times it is the miserable quality of the materials purchased by the management—cheap glue, cheap veneer, cheap lumber.

Gentlemen of the office staff responsible for purchasing, I tell you when you expect to save money by purchasing cheap materials you are playing a losing hand. Consult your superintendent every time, and, if possible, let him do the buying. I was in the office of an Ontario furniture manufacturer quite recently while a veneer salesman was trying to unload some stock on the treasurer of the company, who acts as manager and does most of the buying. The treasurer gave the man a sympathetic hearing and then referred him to the superintendent. The salesman wanted to close the deal then and there, but the treasurer said, "Nothing doing! If our superintendent says yes, we buy; if not, we don't."

This is the right spirit. The superintendent is the man who has to produce results from the raw materials, and he should certainly have a say in their purchase. Often the office man is influenced in his decision by a matter of a cent a foot, while the veneer may actually cost 5 cents a foot more by the time the product is manufactured.

Veneer Room Equipment

The glue spreader is a very important machine in the veneering department. This machine should be provided with corrugated rolls, which will assure a nice, even spread of glue. Rolls of this kind will last for years without replacing.

In order to keep glue at the right temperature during use it is well to have the glue pans surrounded by heating coils. The glue spreader can be connected with the heater, as then only a minimum quantity of glue need be carried in the pans. By this method a quantity of glue sufficient for a day's or half-day's work may be melted in the morning and maintained steadily at uniform thickness and temperature until used. The melted glue is fed to the pans only as needed, through open copper troughs. Spreaders can be

obtained as a single roll machine, for coating one side of stock, or as a double roll for coating two sides.

A fact that is being recognized universally is that a large percentage of the trouble experienced in modern veneer rooms is caused by the veneer not being sufficiently dried when laid. The re-dryer is one of the essentials of a modern veneer room.

Attention has been centred lately on the matter of handling stock to and from the presses, and, as a result, many ideas and appliances have been introduced. These appliances have reduced the amount of work in a great many cases, thus also reducing the cost of production.

Most important factors in the evolution of the veneer room are the new presses, trucks, press bottoms, and holding frames for the material going into the press. These have greatly simplified the veneering processes and have done much to reduce the cost of veneered work. There has been involved in the past a great deal of hard, tedious labor that has proven expensive. In lessening the burden of this and reducing it toward the lowest practical minimum the manufacturers of veneer room appliances have done good work for the veneer-using industries.

Hydraulic presses do not require an introduction to our readers. A number of furniture and piano factories have them. Others who do not no doubt appreciate their advantages, but do not use them on account of not having enough veneering to do. When the hydraulic press was first installed it brought into play the question of how much pressure to use.

When hand-screws and screw-presses were used it was customary to screw them as tight as one's strength permitted, and let it go at that. Accordingly, it was difficult to regulate the pressure. One man might be stronger than the other or not so tired, and consequently the pressure varied. The hydraulic press made this easy as it is a simple matter to secure and maintain a record of hydraulic pressures.

Many small factories haven't enough work for a hydraulic press, and are obliged to use screw-presses. Good work can be done with these, but in selecting them the amount of pressure per square inch should be determined. We have found that the best results are obtained by using 150 pounds per square inch. All presses made with a 2-inch screw should be designed to withstand a pressure of 8 tons per screw.

To find the tonnage, multiply the length by the width of the stock; then multiply this by the pressure per inch you desire, and divide the result by 2,000. It is a simple matter to determine from the result obtained the number of screws required.

The ideal method of treating veneered stock when it is removed from the presses is to pile it on cross strips in a warehouse where the temperature and the air circulation can be controlled and regulated. Veneered stock should always be piled on straight, dry piling strips of a uniform thickness. The stock should be absolutely dried out before it is delivered to the trim saws.

We must, of course, have a pretty warm temperature in the drying room, but the same common sense must be used here that would be required in drying lumber or varnishes, although the temperature must not be as high as would be required in drying lumber. Another point to be remembered is that air circulation is very necessary. This point is, no doubt, thoroughly understood by manufacturers, so that we will not discuss it here.

Cause of Uneven Surface

By Ellis Blakely

The writer is frequently called upon to solve some perplexing problems, but none more so than the one presented by the uneven surface of the top of a fine walnut sideboard in a furniture store recently. The article was well veneered and the workmanship, in every respect except the one above mentioned, was all that could be desired. But this one defect discounted all the other efforts to produce a high-class article. The top looked as though it had been hand-scraped by a novice who had scraped it full of holes. But on second thought I felt that that could not be, because the makers of the article have a wood-scraping machine and these machines make a perfectly even job. Not only that, but the indentations were too deep to be made in the face veneer without going through.

There were several of us examining the article and each had a different theory as to the cause except myself; and I confess I had none, as certain known conditions seemed to combat every theory that was advanced by others, as well as any that might present themselves to my mind, and I decided to make a special effort to visit the veneer room of the factory in question and ascertain the cause at first hand.

Fortune favored me, and a few days later I found myself in that factory, in the company of the superintendent. We were in the showroom and standing before a sideboard of the same design as the one I had seen some days before in the furniture store; and the one before me had the same defects. In order to give me a chance to discuss these defects without in any way hurting the superintendent's feelings, I rubbed my hand over two or three of the indentations in a casual way and went on talking as though my mind was not following my hand, but was concentrated on the things I was saying. The mental effort and the movement of the hand were sufficient to accomplish my purpose and attract the superintendent's attention to the thing that was uppermost in my mind, and he, too, rubbed his hand over the top, and in a way that almost ignored what I was saying, inclined his head and examined the top critically. I at once ceased talking and waited for him to speak.

"There is a thing that has given me a world of worry," he said, "and I would give a good deal to find out the cause of it."

"It is rather a peculiar thing," I answered, and then waited for him to proceed.

"We exercise the utmost care in cleaning up the stock, and every top is run through the machine scraper and made perfectly smooth and even before being finished. In fact, these defects do not show up until some time after they are finished. We never notice them when they are first varnished; not until they are brought out to be rubbed are these defects detected. Some people have suggested that the varnish has not been put on evenly, but the finisher disproves that theory by pointing to the fact that nothing wrong is noticed when the goods are freshly varnished. Others, again, have suggested that it is caused through the uneven shrinkage of the varnish, but the finisher contends that cannot be, either, because the varnish is of a uniform consistency and applied thoroughly even. He further argues that if uneven shrinkage of the varnish were the cause he would be able to rub it smooth again if there was a perfectly smooth surface beneath. But against this contention of the finisher is placed the fact that the goods are perfectly smooth when they enter

OAK MAHOGANY CIRCASSIAN MAPLE

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WE SPECIALIZE ON—

POPLAR CROSS-BANDING AND BACKING VENEER

Highest Grade — Right Prices

The Largest Poplar Veneer Mill in the World

THE CENTRAL VENEER CO., HUNTINGTON, WEST VIRGINIA

the finishing room. And there is where we all stick. That is what makes the problem so perplexing."

"Suppose we take a look through the veneer room," I suggested.

We had not been there very long before the cause of the trouble was quite plain to my mind. They were using ⅛ in. rotary-cut whitewood cross-banding, and were laying the face veneer and the cross-banding at the one operation. In cutting the cross-banding a smooth job had not been made, and the wood had been torn out in places. This cross-banding was being put on without anything being done to smooth it up. When I suggested this as the probable cause of the trouble the superintendent answered:

"But these slight depressions in the cross-banding fill up with glue, and, even if they do not, the face veneer is made perfectly even and smooth with the machine scrapers."

"Quite true," I replied, "but the trouble lies in the fact that the wood does not remain smooth after having been made so. The glue in these depressions continues to shrink long after the stock is cleaned; hence the fact that the trouble is not discovered until after the goods are almost ready to ship. Not only does the glue continue shrinking, but these depressions are not subject to the same heavy pressure as the higher parts when in the press, consequently they swell up. In the process of drying these parts shrink back again and leave these depressions in the finished article."

"Well, how would you prevent this trouble and use this same cross-banding?" asked the superintendent.

"In the first place, if the cross-banding is too bad, I would smooth off the under side before laying, by running it through the sander, using very coarse paper. Then I would lay the cross-banding and face veneer at different operations, giving the cross-banding a reasonable time to dry before laying the face veneer. This will give you an opportunity to smooth off the outer surface before laying the face veneer. This may be done on the sander with coarse paper. It may also be done on the scraper. Some manufacturers are making a knife specially designed for this work, to be used in the scraper. Stock prepared in this way will never give the trouble you have experienced along this line." —Veneers.

Millwork Costs

At a meeting of the Southern Millwork Manufacturers, held at Asheville, N.C., on August 20, the importance of accurate cost accounting was the subject of a paper read by W. T. Flint, of the Millwork Cost Information Bureau, Chicago. He emphasized the necessity for knowing the actual cost of each piece of material going into the work, in addition to full knowledge of labor cost, as the only means of doing business at a profit. Knowledge of costs, he said, was never more necessary than at the present, when prices of raw material are subject to frequent and sharp advances in price.

After a full discussion of a proposed uniform estimate form, the secretary of the association was instructed to have such forms printed and submitted to the members and presented for ratification at the next meeting.

Secretary John M. Pritchard, of the Gum Lumber Manufacturers' Association, Memphis, was one of the speakers at the meeting.

After we get your order—

—then what?

SERVICE-SERVICE-SERVICE

How many repeat orders would we get from you if we did otherwise? Not many—not any. We realize that in order to hold our old customers and to make new ones it is essential that we become more than mere "order-takers." That is why your order receives such careful attention upon reaching our office.

Think of how much this careful selecting of figures means when you are unable to visit our stock-rooms in person—**then send your order to us.** We always carry a large stock of **MAHOGANY, AMERICAN WALNUT, QUARTERED OAK, GUM and POPLAR** at prices unusually attractive.

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OAK MAHOGANY CIRCASSIAN MAPLE

VENEERS

BIRCH POPLAR CHERRY WALNUT GUM

Wood - Mosaic Co.
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WALNUT
Lumber — Dimensions — Veneers

If you are in the market for anything in Walnut, let us figure with you. We have cut three million feet of Walnut in the last year, and have a good stock of all thicknesses dry. We can also furnish Walnut dimension—**Walnut Veneers.** We have a large stock of veneers, plain, stripe figured and stump wood.

Wood-Mosaic Co., Inc.
NEW ALBANY, - - IND.

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Write for prices on all
Plain and Fancy Lumbers and Veneers
Mahogany, Oak, Birch, Walnut, Ash, Poplar, etc., rotary, sliced or sawed in all thicknesses

Your Patronage Respectfully Solicited

Prompt attention given to all enquiries, and SAMPLES SENT IMMEDIATELY ON REQUEST, or representative will call.

George Kersley
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AMERICAN WALNUT VENEER

Have you seen samples of the Wood we are producing?

A large line of the finest AMERICAN WALNUT VENEERS in Sliced, Half-Round and Stump Wood is ready for your inspection.

The beauty about it is its uniformity and can be matched by us at any time.

No freaks, but good solid substantial and well manufactured Veneer that causes a consumer to create his lines knowing that it can be maintained.

A wire or letter is all that is necessary.

Roberts Veneer Co., New Albany, Ind.

"The Pioneer Walnut Veneer Producers of America."

OAK MAHOGANY CIRCASSIAN MAPLE

VENEERS

BIRCH POPLAR CHERRY WALNUT GUM

Mahogany
Figured Red Gum
American Walnut
Curly Birch
Quartered White Oak
(Sawn or Slice Cut)
And all other kinds of

Domestic Veneer
AND
Thin Lumber

ACME VENEER & LUMBER CO.
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We can ship
IMMEDIATELY

2 cars of 1/20 in. Unsel. Gum Veneer.
4 cars of 1/4 in. Unsel. Gum Veneer.
3 cars of 1/8 in. Unsel. Birch Veneer.
2 cars of 1/16 and 1/8 in. Red Oak Veneer.
15 cars of Panels, 3/16 to 1/2 in., in various woods.

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Any Kind of Wood Any Thickness
We are Chicago agents for WOCO FIR PANELS, and carry a full and complete line in all stock sizes and all thicknesses at our Chicago warehouse for immediate shipment.
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Give your business to the man who will spend his time and money to get in touch with you. He deserves it—if his stock and prices are right.

OAK MAHOGANY CIRCASSIAN MAPLE

VENEERS

BIRCH POPLAR CHERRY WALNUT GUM

AT GRAND RAPIDS

READY TO SHIP

Poplar Crossbanding
Gum Veneers
Plain Oak
Quartered Oak
Mahogany

Immense Stocks — Right Prices
Write us

WALTER CLARK VENEER CO.
Grand Rapids

Indiana White Oak Lumber and Veneers

Band sawed from the best growth of timber.
We use only the best quality of Indiana White Oak.
From four to five million feet always on hand.

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Our stock assures you good service.

Chas. H. Barnaby, Greencastle, Indiana

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Chapter 3—Testing and Grading
Chapter 4—Methods in the Glue Room
Chapter 5—Glue Room Equipment
Chapter 6—Selection of Glue

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Woodworker Publishing Co. Limited
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The Lumber Market

Domestic Woods

The only feature of any importance in connection with the lumber market in Canada is the curtailment of orders for munitions, as this will have an effect on the shell box business. It is not known whether the Imperial Munitions Board has rescinded any of the orders which they recently placed for Bethlehem boxes and other types. As no further orders are being given out for shells, however, it is quite likely that they will do so.

Stopping the manufacture of shell boxes will no doubt have some effect on the lumber situation. For one thing, it will have a tendency to relieve the demand on the present stocks. But it is doubtful whether it will cause any alteration in prices. This can hardly be expected in view of the steadily-increasing cost of lumber production.

A number of lumber firms are sending logging crews into the woods, but they appear to be doing so in a half-hearted manner. For one thing, they are up against it for experienced labor, and they are obliged to pay high wages to inexperienced labor. The cost of all food and camp supplies is high. And, on the top of this, the lumber manufacturer does not know whether there will be any demand for his product next summer or not.

At the present time wholesale lumbermen state that buying is fairly good. The furniture manufacturers, who have ben holding off for a couple of months, are commencing to stock up again for their fall and winter trade. Automobile and implement factories are doing a steady volume of business, and are in the market for a steady supply of hardwoods. Then the piano factories are also busy and placing good orders for lumber.

In view of these conditions, it is difficult to see any relief in store for woodworking plants in the way of reduced lumber prices. Prices on some of the prominent woods at Toronto for car lots are: White ash, firsts and seconds, 1½ and 2 in., $75; birch, firsts and seconds, inch, $58; basswood, firsts and seconds, inch, $53; soft elm, firsts and seconds, inch, $48; rock elm, firsts and seconds, 1½ and 2 inch, $65; soft maple, firsts and seconds, inch, $48; hard maple, firsts and seconds, inch, $47; Douglas fir, No. 1 and 2, 1 inch, clear, $50.75.

Imported Woods

Some accurate information regarding the shortage in hardwood stocks in the United States is contained in a report presented at a recent meeting of the Northern Hemlock and Hardwood Manufacturers' Association by the association's secretary. The main features of the report had to do with the volume of hemlock and hardwood stocks that are in the hands of Northern manufacturers, as well as manufacturers in the Michigan territory.

The report showed that on August 1 there had been a decline in hardwood stocks in the association territory of No. 2 and better of 5,386,000 feet and No. 3 common of 10,600,000 feet, making a total decline in hardwood stocks of No. 3 and better of 15,586,000 feet. In addition there was a decline of 11,458,000 feet of stocks on hand, sold and unsold, over a year ago, making virtually a decrease of 27,440,000 feet of hardwood stocks on hand to be sold of August 1, as against July 1, 1916. Recent figures were also cited of the Michigan Hardwood Manufacturers' Association, which showed a decrease for a corresponding period of hardwoods in that association's territory of No. 2 and better to be 25,812,000 feet, and of No. 3 common 25,209,000 feet, making a total of 51,021,000 feet. According to these figures, the consuming trade of Northern hardwood faces a shortage in stocks of August 1 over a year ago of 31,198,000 feet of No. 2 common and better, and 35,809,000 feet of No. 3 common only, making a total shortage of a volume in excess of 67,000,000 feet.

A prominent lumberman who was present at the meeting stated that war orders had greatly depleted stocks in the northern sections of the country. A fact that should not be overlooked, he said, is that the fall and winter will witness a severe labor shortage at the mills, and that manufacturing costs are gradually going to higher levels. In discussing the higher price that lumber is bringing, this speaker expressed his opinion, which he said was entirely a personal one, that he questioned very much if lumber would ever go down again, even after the war is over.

During a discussion on the increased consumption of lumber caused by the war, one lumberman who was present at the above-mentioned meeting, stated that his company alone had sold, during one week, between 6,000,000 and 7,000,000 feet of lumber to factories that were not in existence before the war.

R. B. Goodman, a prominent lumberman, who, it is stated, is regarded as an expert on the matter of lumber manufacturing costs, made the statement at the meeting that it undoubtedly costs $4 more a thousand to produce lumber in the Northern States this year than it did last year, and that there is every indication that it will cost $4 more in 1918 than now.

In the Southern States, which is the home of the red gum tree and other Southern hardwoods, conditions have been such that lumber production has been considerably retarded. This, of course, has affected the supply, and has kept prices at a high level. The chief difficulty seems to be a lack of cars to transport the logs to the mills.

It will be seen from the above conditions that there is very little prospect of lumber prices declining. They are more likely to advance. Some of the present quotations at Boston on leading hardwoods are: Ash, $72 to $74; basswood, $59 to $65; birch, red, $72 to $75; birch, sap, $63 to $69; maple, $60 to $62; quartered oak, $92 to $95; plain oak, $69 to $74.

Graphite as a Lubricant

Graphite, says the Scientific American, is not a lubricant, but an aid to keeping a bearing in good working order by filling up the minute irregularities of the shaft and bearing and producing a beautiful polished surface and in this way reduces friction. To get this result only a very small quantity of graphite is necessary, and if too much is applied it simply collects in wads and defeats the purpose intended. It follows that the proper way to use graphite successfully is to mix thoroughly a small quantity with the lubricating oil at suitable intervals and not to apply it continuously, for when the above mentioned polished surface is formed it will last quite a long time before requiring renewal.

Concerning Our 60,000,000 Feet Production

WE HAVE emphasized our **ability** to give **service.** Just how far beyond that of the average operation does this ability require progress? The ratio reaches surprising proportions in an operation which has reached the point of expansion demanded by an annual cut of 60,000,000 feet of hardwoods. For any business must show constant growth or stagnation. Growth, then, of our institution means expanding in a measure which would represent a sizable business in itself.

This is in no way a boastful comparison but merely a frank effort to give a convincing impression of what 60,000,000 feet means. Please think of it as being more than a mere figure. It represents a history of human interest, of human effort, of persistent striving and planning towards the accomplishment of a definite hope.

That hope embodied the ambition to so well know our product and yours, our problems and yours, that sales built on deserved confidence would keep always ahead of any expansion in production. The accomplishment of that ambition, proven by our ability to market such an immense cut is itself proof that what we offer you as a buyer, not only in goods but in experience and service, could be used by you to your definite advantage. Have you some need through the serving of which we may earn from you also the privilege of sustained confidence and friendly business relations? If you have such unfilled wants, may we know them?

SOUTHERN HARDWOODS, PANELS, CROSS BANDING, CORE STOCK

of

Golden Rule Quality

THE ANDERSON-TULLY COMPANY

MEMPHIS, TENNESSEE

News of the Trade

Veneers and Panels, Limited, Montreal, P.Q., have obtained a provincial charter.

The Dominion Carriage Company, Limited, of Montreal, are now equipping their plant.

The Exhibition Commission at Quebec is offering prizes for the best toys made in that city.

The plant, machinery and stock-in-trade of Standard Toys, Limited, of Toronto, is to be sold by tender.

Wm. Williamson, who conducts a planing mill business at 137 Woodbine Ave., Toronto, has had plans drawn for a new building.

While working in Lloyds sash and door factory at Wingham, Ont., Mr. Wm. Reid, an employee, had a couple of fingers badly crushed.

The Elliot Woodworker, Limited, sold five of their machines at the Toronto Exhibition, one of them being purchased by a contractor from Prince Edward Island.

The building and stock of the Gold Medal Furniture Company at Gunnel and Henry Ave., Winnipeg, Man., was totally destroyed by fire recently. The loss is estimated at $50,000.

The newly organized Welland Shipbuilding Company, Limited, are expected to begin operations immediately. They have contracts for two ocean-going ships 260 feet long by 43 feet 6 inches beam.

The Vancouver Toy and Novelty Company of Vancouver, B.C., shipped their first carload of toys recently. They expect to ship about a carload a week from now on to the Prairie Provinces and other large centres.

Mr. A. Pliley, an employee of the Rodney Woodenware Company, Rodney, Ont., suffered a very painful accident recently. His thumb was partly taken off and the rest of his hand mangled while working a circular saw.

Mr. Sanderson Pearcy, well known to the furniture and woodworking trades, as head of Sanderson, Pearcy and Company, dealers in wood finishes, died recently. Mr. Pearcy was 76 years of age and was well known in Toronto business circles.

Mr. W. W. Wood, chief engineer at the plant of Rhodes-Curry Company, Amherst, N. S., met with a serious accident recently. Mr. Woods was fixing a valve on the engine when a box on which he was standing slipped, throwing him forward.

The town of Niagara Falls, Ont., is to have a new industry, Lundy Scott Ltd., having been incorporated with capital of $50,000, to manufacture collapsible and non-collapsible boxes, crates, cases and carriers of various kinds. The materials used will be wood and veneer.

The Nicholson Lumber Company, of Burlington, Ont., showed two silos at their exhibit at the Toronto Exhibition. These silos are constructed of No. 1 Norway pine, dried and treated with a preservative to prevent shrinking or decay. Mr. Nicholson was in attendance at the exhibit, describing the features of the silos.

The Three Rivers Shipyards Limited, has recently been incorporated with capital of $49,000, to manufacture wooden ships. The principal place of business will be Three Rivers, P.Q. Mr. T. M. Kirkwood, merchant, of Toronto, A. E. Valles, Louis Heyman and J. V. Cartier, the latter three all of Montreal, are interested.

Damage estimated at $15,000 has been caused by fire to the box factory of Holmes, Hogue and Company, Chatham Street, Montreal. The factory had been closed for a short time following the death of Mr. J. Arpin, a former partner, and pending the reorganization of the company under the name of Holmes, Hogue and Company.

The Queen City Wood Novelty and Showcase Company, which is a new concern, have secured premises at 11 St. Albans Street, Toronto. They are manufacturing showcases, store fixtures and talking machine cabinets. Later on they will manufacture a line of novelties such as nursery furniture, etc. Mr. Singer is the manager of the company.

The plant of the Three Rivers Box Company at Three Rivers, P. Q., is now under construction. The company advise us that they expect to install their machinery in October. They will manufacture butter boxes, packing cases, etc. Mr. N. E. Clement of N. E. Clement and Cie, Limitee, Three Rivers, P.Q., is interested in the company.

The Boivin Tie & Lumber Company has been incorporated with capital of $40,000, to carry on business as timber merchants, sawmill proprietors and planing mill proprietors. The head office of the company will be located at Timmins, Ont. F. A. Day, W. A. Gordon, H. O. Barnett and O. R. Vallee, all of Haileybury, are interested.

The Dominion Government recently voted $25,000,000 for the purchase of railway rolling stock, including 6,000 cars. Of these 4,000 are to be manufactured by the Canada Car Company, of Montreal, 1,000 by the Eastern Car Company, Amherst, N.S., and 1,000 by the National Car Company, of Hamilton, Ont. The deliveries are to be made between October 1st and February 1st, 1918.

The plant of the Goderich Mfg. Company, Goderich, Ont., has been completely destroyed by fire. The company advise us that the loss is about $90,000, with insurance of about $76,000. They are going to rebuild at an early date and install a sprinkler system as soon as the roof is on. For some time the plant has been engaged making boxes for the Wm. Davies Company and the Harris Abattoir.

Mr. John Firstbrook, of the Firstbrook Box Company, Toronto, and Mrs. Firstbrook, are in Switzerland awaiting the release of their son, Sub.-Lieut. J. H. Firstbrook, of the Royal Flying Corps, who has been interned in Switzerland, where he was sent after being a prisoner in Germany for eight months. Lieut. Firstbrook, who is only 21 years of age, was shot in the back while flying 5,000 feet in the air over the German lines.

Watson Limited, of Bradford, Ont., have reorganized. The name now is Watson Specialties Limited. They will manufacture metal and wood insect screens, rolling partitions, school wardrobes, kitchen cabinets and general planing mill products. The company recently sent out circular letters to screen users pointing out the advantages of their screens, and are making an aggressive effort to capture a large share of this business.

The Toronto Shipbuilding Company are getting their plant in shape. It is located on the new ship canal which has been cut through from Ashbridge's Bay to Toronto Bay They have the keels laid down for two wooden ships which they are building for the Imperial Munitions Board and their woodworking shop is now under construction. The machinery, which has all been purchased, includes a timber sizer which the company claim will be about the largest in operation in Canada. They are also installing a Fay and Egan ship band saw.

Dry Hardwoods

4 cars 3/4 No. 1 Com. and Bet. Plain Red Oak.
5 cars 3/4 No. 1 and 2 Common Plain Red Oak.
10 cars 4/4 No. 1 Common Plain Red Oak.
5 cars 4/4 No. 2 Common Plain Red Oak.
5 cars 4/4 F.A.S. Plain White Oak.
5 cars 4/4 No. 1 Common Plain White Oak.
5 cars 4/4 No. 2 Common Plain White Oak.
5 cars 6/4 No. 1 Com. and Bt. Plain White Oak.
5 cars 8/4 No. 1 Com. and Bt. Plain White Oak.
3 cars 8/4 No. 2 Common Plain White Oak.
2 cars 4/4 F.A.S. Quartered White Oak.
2 cars 4/4 No. 1 Common White Oak.
6 cars 6/4 F.A.S. White Oak.

We also have a fine stock of Northern Hard Maple, Birch, Basswood, etc.

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Chicago Office: 1665 Old Colony Bldg. J. C. Moffat, Rep.
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2 Cars 8/4 FAS Dry Sap Gum.
1 Car 8/4 No. 1 Com. Dry Sap Gum.
2 Cars 8/4 No. 2 Com. Dry Sap Gum.
2 Cars 4/4 No. 1 Com. Dry Sap Gum.
2 Cars 4/4 FAS Dry Sap Gum.
5 Cars 4/4 No. 2 Com. & Btr. Dry Pl. Oak.
4 Cars 4/4 FAS Wide Dry Pl. White Oak.
2 Cars 2½ x 2½-30 in. Clear Sap Gum.
1 Car 3 x 3-30 in. Clear Sap Gum.
2 Cars 2 x 2-19 in. Clear Oak.
1 Car 1 x 2-40 in. Clear Dry Oak.
1¼ x 2-40 in. Clear Dry Oak.

N.B.—We manufacture Dimension of all kinds at our own mill.

The Probst Lumber Co.

Cincinnati, Ohio

We Offer for Prompt Shipment

2 Cars 4/4" No. 2 Com. & Btr. Winter-cut Basswood
4,500' 6/4" No. 2 Com. and Btr. Winter-cut Basswood.
2 Cars 4/4" No. 2 Com. and Btr. Summer-cut Basswood
4 Cars 4/4" No. 3 Com. and Btr. Birch
1 Car 4/4" 1s and 2s Birch
30 M.' 6/4" No. 1 Com. and Btr. Birch
20 M.' 8/4" No. 1 Com. and Btr. Birch
32 M.' 10/4" No. 1 Com. and Btr. Birch.
2 Cars 8/4" No. 2 Com and Btr. Winter-cut Hard Maple (Not over 10% No. 2 Com.)
4 Cars 4/4" No. 2 Com. and Btr. Black Ash
4 Cars 4/4" Hardwood Crating
1 Car 4/4" Elm Crating
2 Cars 4 x 6" Hardwood Hearts
2 Cars 8/4" No. 1 Com. and Btr. Soft Elm.
1 Car 12/4" No. 1 Com. and Btr. Soft Elm

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Box Association Holds Annual Meeting

The National Association of Box Manufacturers held their 18th semi-annual convention at Boston on the 8th, 9th and 10th of August, during which thirteen new concerns joined the association.

The secretary's report dealt with a number of matters of interest to the box factory. In connection with the declaration of war by the United States it was mentioned that the box manufacturers offered to the Government such services as the wooden box industry of the United States has at its command. The matter was taken up with the National Defence Committee, and the secretary of the Box Association by personal visits to Washington has been working with that Committee for some time past. Through the suggestions of the box manufacturers, a representative connected with the Forest Products Laboratory at Madison, Wis., who is thoroughly acquainted with lumber and box strengths, has been appointed to devote his entire time to the working out of box specifications, which will be used by the government, such testing and suggestions for changes in the present specifications to be done in co-operation with the National Box Manufacturers' Association.

It was also pointed out by the secretary that the Association's first move had been to secure from the various government departments all specifications for containers which have been developed by them in the past, and many of which it has already been determined can be so changed as to make them more easily manufactured by correcting thicknesses, widths of lumber used, etc., and still manufacture a box that will safely carry the contents. The Laboratory at Madison, Wis., is now working out these corrections, which will be passed to the Box Association before they are finally sent to Washington with recommendations for approval.

It has further been decided that if it is necessary a representative of the Box Association will be appointed who will take up quarters in Washington, where he will be prepared to work with the National Defence Committee on any matter coming before it pertaining to the wooden box industry, and of which practical knowledge is essential. Such co-operation as this between the government and the Box Association augurs well for both parties. If something of this nature had been worked out in Canada when the shell box business first became active a great deal of dissatisfaction caused by shell box inspection and other matters connected with the industry would have been eliminated.

Another matter of interest to box manufacturers which was taken up at the convention was the uniform figuring schedule. In speaking of this the secretary said:—"I believe the majority of box and shook manufacturers of the country are now using the uniform figuring schedule adopted in 1915 by this Association. There is not a single one in the country who should not be using this schedule. One of the great difficulties with our industry has always been the lack of uniformity in doing anything, and we will never be able to change such a condition until we are willing to progress, and through our progressiveness drop the old obsolete ways of doing business and get up-to-date, and when the greatest percentage of the representatives of the industry are willing to make changes in their methods of doing business that looks towards the uniformity and progress let us assist in bringing about such changes. The uniform figuring schedule should

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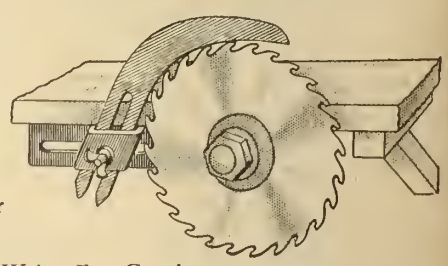

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be, I believe, adopted and used by every manufacturer. Let us keep after this progressive work until this has been brought about."

The subject of a uniform cost finding and accounting plan for the box industry was dealt with at some length. This subject was taken up by the Association at the last meeting and the committee appointed to lay the foundation for the work made their report. The cost chart which was submitted by them was unanimously adopted and the subject was referred back to the committee for developing all the details necessary for cost finding and accounting. This cost chart, showing the allocation of the various items of expense, was published in the July issue of the "Canadian Woodworker." The cost finding and accounting plan has now been completed in all its details and copies can be obtained by writing to the secretary of the National Box Manufacturers' Association.

The uniform selling contract was also dealt with at the convention. This selling contract was drawn up by the Association some time ago and the secretary in his report stated that it was now being used by a great many manufacturers who had found it a good investment during the past year when rate changes had been so frequent. He said further:—"This contract is a good safe one for any manufacturer to use. It has many advantages for the manufacturer, and I believe should be made the standard contract of the Association, and every member at least should use it. Our supply is exhausted at the present time, but if the manufacturers are interested and will write the office I will see that they are furnished with a copy so that they can have the same reproduced for their own account.

"Uniformity, or standardization, as you may call it, I believe is very essential for this industry. A lack of it, I feel, has been one of the greatest drawbacks to the box business. If we have more universal customs well established and in use I am very certain the manufacturers would reap greater benefits than at present. This is one of the many important questions and factors that the National Association is now striving for, and by using a standard feetage estimator, uniform figuring schedule, selling contract, style sheet, grading rules, and a uniform cost finding and cost keeping plan, we will be nearer together and have less contention than has heretofore existed. All of these factors have a tendency to keep the manufacturers working in harmony and that is just what we are trying to accomplish in national association work."

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The Carrier Air Conditioning Company of America, with head office at Buffalo, N. Y., are sending out to the trade a folder describing their carrier air washers. On the outside of the folder is printed "Look Inside for Details." The folder is so made that it shows the actual construction both inside and outside of the carrier air washers. These air washers are used in factories, office buildings, etc., wherever large numbers of people congregate. They wash and temper the air so that it is fit to breathe. The air is mixed and wet down with a uniformly distributed atomized spray. These air washers are fully described and illustrated in a catalogue published by the manufacturers. The company will be glad to send one of these catalogues to any person wishing further details.

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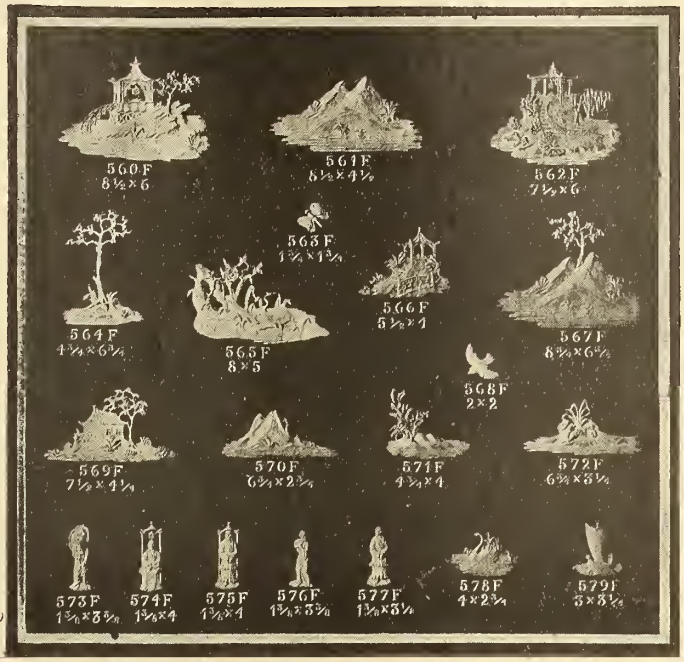

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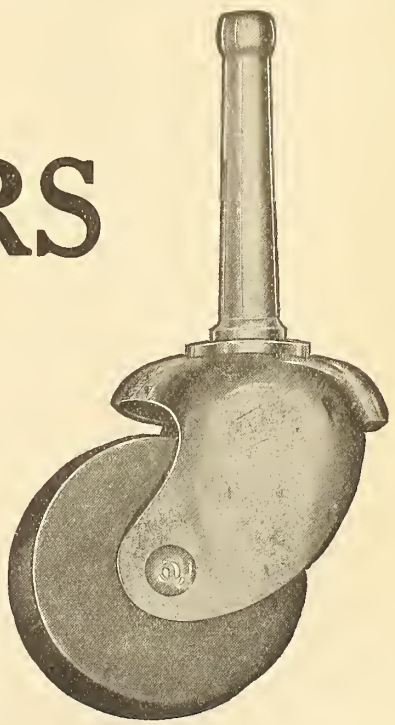

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Box 32, Canadian Woodworker, 345 Adelaide West, Toronto. 8-9

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4 Power Feed Rip Saws.
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1 Cowan Tilting Table Saw.
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1 New Britain No. 7 Chain Saw Mortiser.
1 New Britain No. 2 Chain Saw Mortiser.
1 Set Beach Boxmakers Saws.
1 Set Cowan Boxmakers Saws.
1 Berlin 54 in. No. 289 Band Resaw.
1 Berlin 11-471 Glue Jointer
1 Outfit Band Resaw Fitting Machinery
1 Emery Grinder on Pedestal
1 Robinson Band Saw Setting Machine
1 Dowel Machine with six heads
1 Cowan Horizontal Band Resaw ((Hopper Feed)
1 Nichols Arm Sander (American)
2 Turning Lathes
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1 Greenlee Sash Relisher & Hollow Chisel Mortiser
1 Outfit Morgan Lock Corner Machinery
1 A.B.C. Planing Mill Exhauster and Piping, 60 in. Single
1 30 in. Single Planing Mill Exhauster
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1 60 in. Columbia Sander
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When buying bits test them to see if they are straight. A drill or bit should run so nicely in the chuck that at a little distance no motion can be perceptible to the eye. Such a drill will begin a hole where it is wanted and finish it properly. When buying a new drill or bit, study it carefully, and determine whether it is more efficient than the bit or bits you are using.

The speed of drills and bits for the best work, and the most work, is far too little studied. Most boring machines run too slow, and perhaps some are not constructed to run the proper speed. A grindstone gait may be tolerated in a job shop, but in furniture factories where men are expected to bore thousands of holes every day and make them nice, there is a loss of time on slow speed machines that would shock many furniture manufacturers if they knew what it meant in time and quality.—A. Deinzer, in Southern Furniture Journal.

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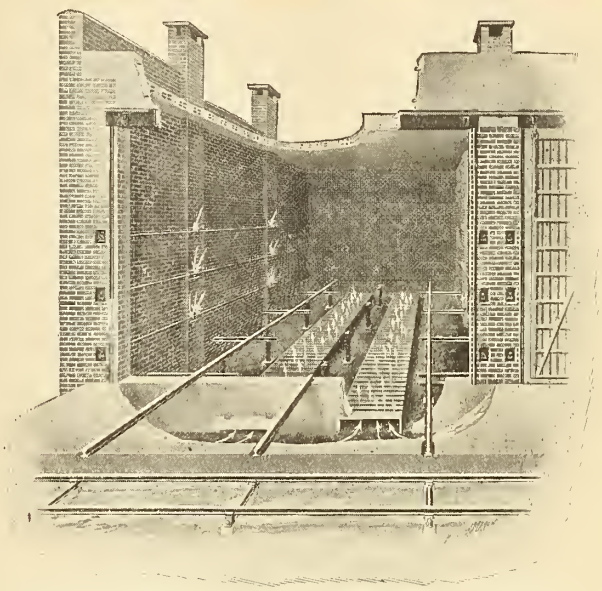

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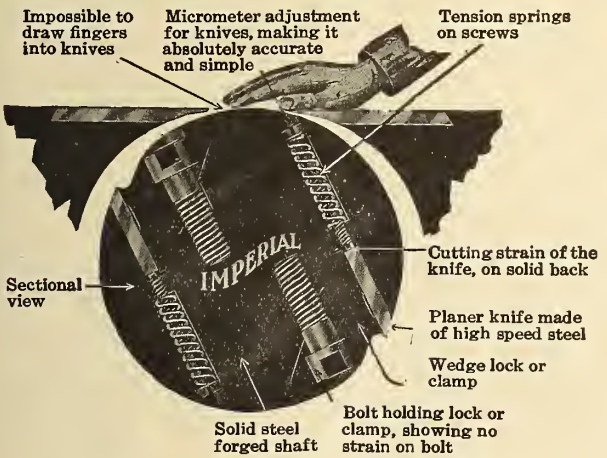
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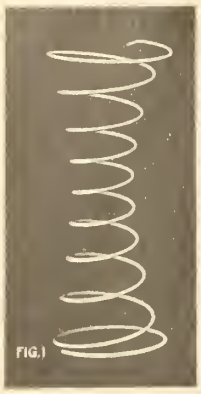

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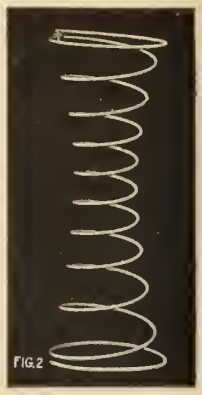

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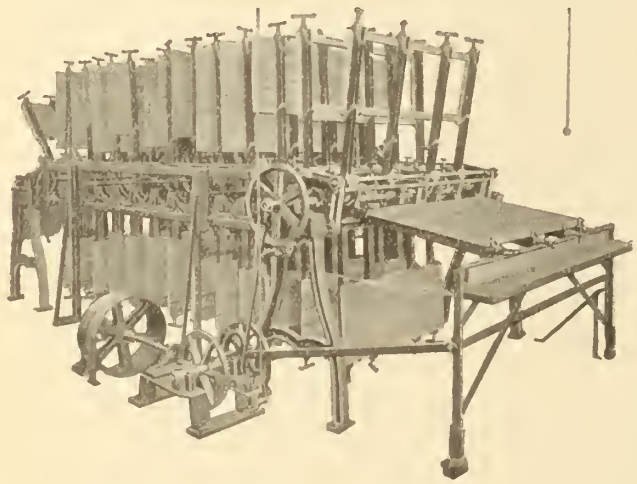

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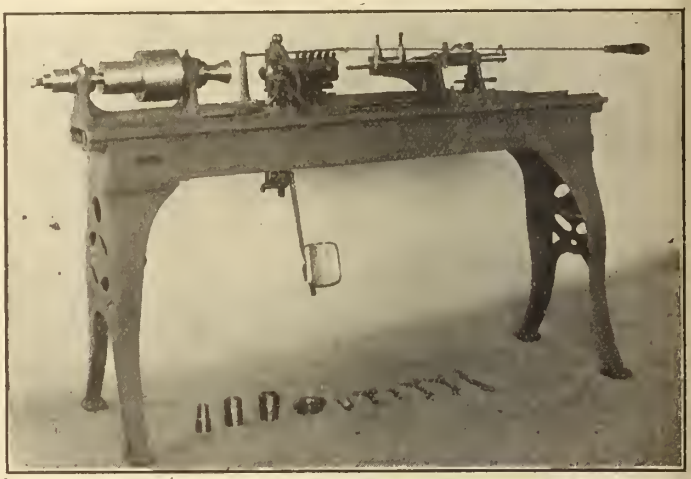

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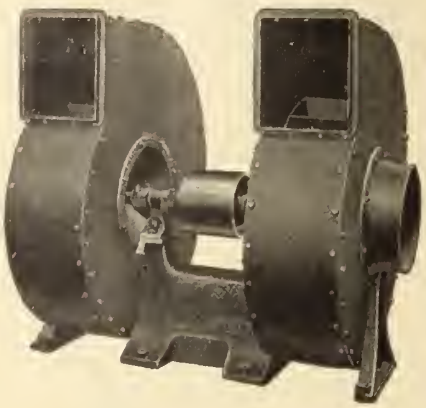

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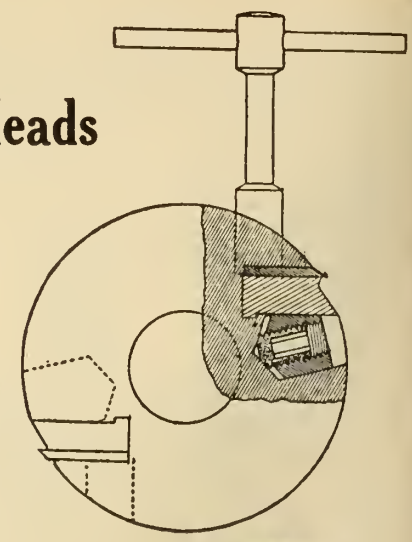

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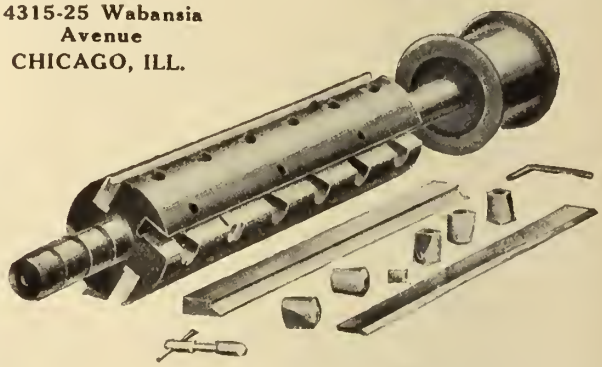

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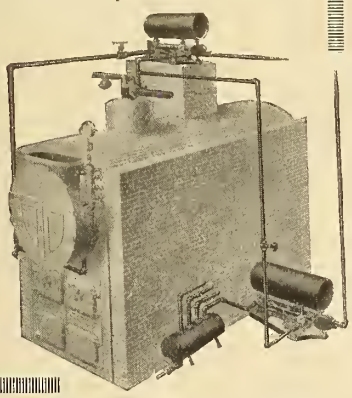

Canadian Morehead Manufacturing Company
DEPT. H
WOODSTOCK, ONTARIO

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GRAND RAPIDS
MICHIGAN

Increasing output of other kilns is part of our business.

We can arrange to utilize your present equipment and supplement with sufficient additional to bring your kilns to our basis of output.

We would suggest that you supply our engineering department with description of your kilns and lumber drying needs, so we can understandingly outline what can be done.

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Cabinet Making, by J. H. Rudd. Published by Grand Rapids Furniture Record Company. 210 pages, illustrated. Price $1.50.

Saw Fitting Manual, a treatise on the care of saws and knives. Deals with everything in the saw and knife alphabet, from adjustments to widths. 144 pages. Price $2.00.

Common-sense Handrailing, by Fred T. Hodgson. Published by Frederick J. Drake & Company, Chicago. 114 pages, illustrated. Price 50c.

Roof Framing Made Easy, by Owen B. Maginnis. Published by The Industrial Publication Company, New York. 164 pages, illustrated. Price 50c.

"Carpentry," by Ira S. Griffith. Published in 1916 by The Manual Arts Press. 188 pages, illustrated. Price $1 00.

Handrailing Simplified, by An Experienced Architect. Published by William T. Comstock, New York. 52 pages, illustrated. Price 50c.

How to Join Mouldings; or, The Arts of Mitering and Coping, by Owen B. Maginnis. Published by William T. Comstock, New York. 72 pages, illustrated. Price 50c.

Utilization of Wood-Waste (Second Revised Edition), by Ernst Hubbard. Published in 1915 by Scott, Greenwood & Sons. 192 pages, illustrated. Price $1.50.

Woodworker Publishing Company, Limited

345 Adelaide Street West, Toronto, Ontario

The "Canadian Woodworker" Buyers' Directory

An Index to the Best Equipment and Supplies

ABRASIVES
The Carborundum Co., Niagara Falls, N.Y.

AIR BRUSH EQUIPMENT
DeVilbiss Mfg. Co., Toledo, Ohio.

ANNUNCIATORS
Signal Systems, Limited, Toronto, Ont.

BABBITT METAL
Canada Metal Company, Toronto, Ont.
Hoyt Metal Co., Toronto.

BALL BEARINGS
Chapman Double Ball Bearing Co., Toronto.

BALUSTER LATHES
Garlock-Walker Machinery Co., Toronto, Ont.
Mattison Machine Works, C., Beloit, Wis.
Whitney & Son, Baxter D., Winchendon, Mass.

BAND SAW FILING MACHINERY
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Preston Woodworking Machinery Company, Preston, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

BAND SAWS
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Cowan & Co., Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

BAND SAW MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

BAND SAW STRETCHERS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Yates Machine Co., P. B., Hamilton, Ont.

BENDING MACHINES
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio,
Garlock-Walker Machinery Co., Toronto, Ont.
Perfection Wood Steaming Retort Company, Parkersburg, W. Va.

BELLS, ELECTRIC
Signal Systems, Limited, Toronto, Ont.

BELTING
Fay & Egan Co., J. A., Cincinnati, Ohio.

BENCH PLANERS
Wallace & Co., J. D., Chicago, Ill.

BLOWERS
Canadian Blower & Forge Co., Kitchener, Ont.
Sheldons, Limited, Galt, Ont.
Toronto Blower Co., Toronto, Ont.

BLOW PIPING
Sheldons, Limited, Galt, Ont.

BORING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
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Mereen-Johnson Mach. Co., Minneapolis, Minn.
Nash, J. M., Milwaukee, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Reynolds Pattern & Machine Co., Moline, Ill.
Yates Machine Co., P. B., Hamilton, Ont.

BOX BANDS
American Steel Band Co., N. S., Pittsburgh, Pa.
Laidlaw Bale-Tie Co., Hamilton, Ont.

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Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mereen-Johnson Machine Company, Minneapolis, Minn.
Neilson & Company, J. L. Winnipeg, Man.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

CABINET PLANERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

CARS (Transfer)
Sheldons, Limited, Galt, Ont.

CARBORUNDUM PAPER
Carborundum Co., Niagara Falls, N.Y.

CARVING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

CASTERS
Burns & Bassick Co., Bridgeport, Conn.
Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.

CLAMPS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Neilson & Company, J. L., Winnipeg, Man.
Preston Woodworking Machinery Company, Preston, Ont.

COLUMN MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

CORRUGATED FASTENERS
Acme Steel Goods Company of Canada, Ltd.

CRATING LUMBER
Read Bros., Limited, Toronto.

CUSTOMS TURNINGS
Galbraith & Co., Ltd., Owen Sound, Ont.

CUT-OFF SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

CUTTER HEADS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, Beloit, Wis.
Shimer Cutter Head Co., Galt, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

DOVETAILING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

DOWEL MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

DOWELS
Toy Products Co. of Canada, Farm Point, Que.

DRY KILNS
Grand Rapids Veneer Works, Grand Rapids, Mich.
National Dry Kiln Co., Indianapolis, Ind.
Sheldons, Limited, Galt, Ont.

DUST COLLECTORS
Sheldons, Limited, Galt, Ont.

DUST SEPARATORS
Sheldons, Limited, Galt, Ont.

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Canada Machinery Corporation, Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont
Radcliff Saw Mfg. Co., Toronto, Ont.

EDGERS (Gang)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
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Yates Machine Co., P. B., Hamilton, Ont.

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Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

EXHAUST FANS
Garlock-Walker Machinery Co., Toronto, Ont.
Sheldons Limited, Galt, Ont.

FEED ATTACHMENTS
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.

FLOORING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

FLUTING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.

FLUTING AND TWIST MACHINE
Preston Woodworking Machinery Company, Preston, Ont.

FURNITURE CARVINGS
Decorators Supply Co., Chicago, Ill.

FURNITURE LEATHER
Boulee Fraser Leather Co., New York.
Eagle-Ottawa Leather Co., Grand Haven, Mich.

FURNITURE TRIMMINGS
Burns & Bassick Co., Bridgeport, Conn.
Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.
Weber Knapp Co., Jamestown, N.Y.

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Yates Machine Co., P. B., Hamilton, Ont.

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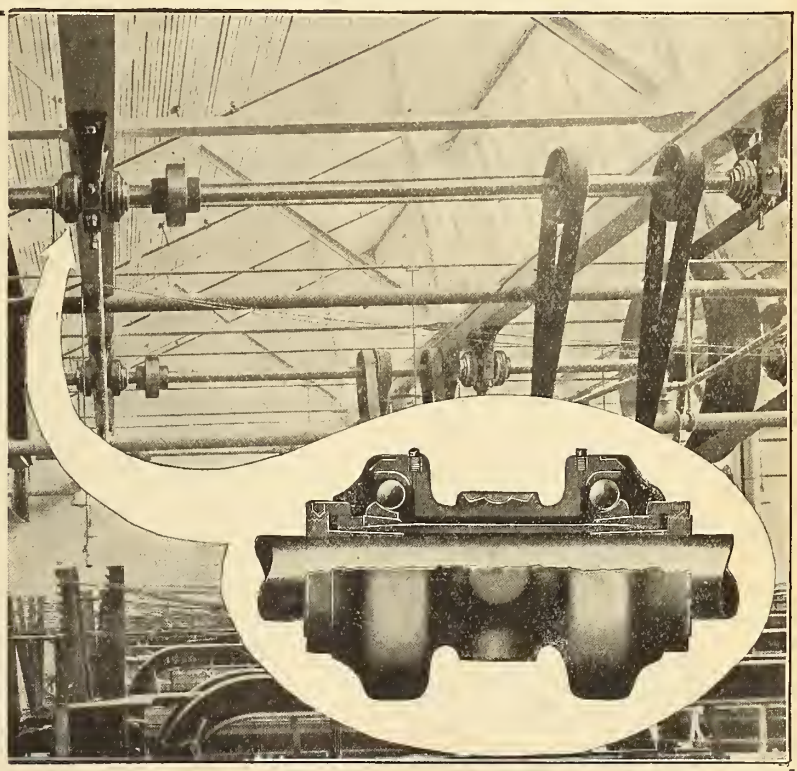

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American Branch: The Transmission Ball Bearing Co., Inc., 32 Wells St., Buffalo, N. Y.

"Canadian Woodworker" Buyers' Directory—Continued

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Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Neilson & Company, J. L., Winnipeg.

GLUE HEATERS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Kitchener, Ont.

GLUE JOINTERS
Canada Machinery Corporation, Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Yates Machine Co., P. B., Hamilton, Ont

GLUE SPREADERS
Fay & Egan Co., J. A., Cincinnati, Ohio
Jackson, Cochrane & Company, Kitchener, Ont.

GLUE ROOM EQUIPMENT
Billstrom, Nels. J., Rockford, Ill.
Perrin & Company, W. R., Toronto, Ont.

GRINDERS (Cutter)
Fay & Egan Co., J. A., Cincinnati, Ohio.
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.

GRINDERS, HAND AND FOOT POWER
The Carborundum Co., Niagara Falls, N.Y.

GRINDERS (Knife)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

GRINDERS (Tool)
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Kitchener, Ont.

GRINDING WHEELS
The Carborundum Co., Niagara Falls, N.Y.

GROOVING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Mattison Machine Works, C., Beloit, Wis.

GUARDS
Gustafson & Scott Mfg. Co., Chicago, Ill.

GUM LUMBER
Anderson-Tully Co., Memphis, Tenn.
Brown & Co., George C., Memphis, Tenn.
Churchill-Milton Lumber Co., Louisville, Ky.
Thomas & Proetz Lumber Co., St. Louis, Mo.

GUMMERS, ETC.
Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND PROTECTORS
Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND SCREWS
Fay & Egan Co., J. A., Cincinnati, Ohio.

HANDLE & SPOKE MACHINERY
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Whitney & Son, Baxter D., Winchendon, Mass.

HARDWARE
Acme Stamping & Tool Works, Hamilton, Ont.
Burns & Bassick Co., Bridgeport, Conn.
Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.
Laidlaw Bale-Tie Co., Hamilton, Ont.
Weber-Knapp Co., Jamestown, N.Y.

HARDWOOD LUMBER
American Hardwood Lumber Co., St. Louis, Mo.
American Oak Mfrs.' Assn., Memphis, Tenn.
Anderson-Tully Co., Memphis, Tenn.
Atlantic Lumber Company, Toronto.
Banning, Leland G., Cincinnati, Ohio.
Bennett Lumber Co., Montreal, Que.
Brown & Company, Geo. C., Memphis, Tenn.
Burns & Knapp Lumber Co., Conneautville, Pa.
Churchill-Milton Lumber Co., Louisville, Ky.
Clark & Son, Edward, Toronto, Ont.
Dermott Land & Lumber Co., Chicago, Ill.
Felger Lumber and Timber Co., Grand Rapids, Mich.
Graves, Bigwood Company, Toronto, Ont.
Kersley, Geo., Montreal, Que.
Korn-Conkling Co., Cincinnati, Ohio.
Martin-Barriss Co., Cleveland, Ohio.
Paepcke Leicht Lumber Co., Chicago, Ill.
Payson Smith Lumber Co., Minneapolis, Minn.
Pickrel Walnut Co., St. Louis, Mo.
Probst Lumber Co., Cincinnati, Ohio.
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Spencer, C. A., Montreal, Que.

HUB MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
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Cowan & Co., Galt, Ont.
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

KNIVES (Planer and others)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

LATHES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Defiance Machine Works.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.

LUMBER
Aberdeen Lumber Co., Pittsburg, Pa.
Acme Veneer & Lumber Co., Cincinnati, Ohio.
American Hardwood Lumber Co., St. Louis, Mo.
Anderson-Tully Co., Memphis, Tenn.
Banning, Leland G., Cincinnati, Ohio.
Barr-Holaday Lumber Co., Greenfield, Ohio.
Bennett Lumber Co., Montreal, Que.
Brown & Company, Geo. C., Memphis, Tenn.
Churchill, Milton Lumber Co., Louisville, Ky.
Clark & Son, Edward, Toronto, Ont.
Dermott Land & Lumber Co., Chicago, Ill.
Felger Lumber and Timber Co., Grand Rapids, Mich.
Graves, Bigwood Company, Toronto, Ont.
Hartzell, Geo. W., Piqua, Ohio.
Huddleston, Marsh Mahogany Co., New York.
Korn-Conkling Company, Cincinnati, Ohio.
Long-Knight Lumber Co., Indianapolis.
Paepcke Leicht Lumber Company, Chicago, Ill.
Payson Smith Lumber Co., Minneapolis, Minn.
Pickrel Walnut Co., St. Louis, Mo.
Probst Lumber Co., Cincinnati, Ohio.
Read Bros., Limited, Toronto.
Shreiner Lumber Co., Pittsburgh, Pa.

MACHINE KNIVES
Canada Machinery Corporation, Galt, Ont.
Peter Hay Knife Company, Galt, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

MITRE MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

MITRE SAWS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.

MULTIPLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.

NITROGEN LAMPS
Canadian Laco Philips Co., New York and Toronto.

PANELS
Waetjen & Co., George L., Milwaukee, Wis.

PATTERN SHOP MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PERIOD MOULDINGS
Waddell Mfg. Co., Grand Rapids, Mich.

PLANERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Wallace & Company, Chicago, Ill.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PLANING MILL MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PRESSES (Veneer)
Canada Machinery Corporation, Galt, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Perrin & Co., Wm. R., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.

PULLEYS
Fay & Egan Co., J. A., Cincinnati, Ohio.

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Gum Lumber Manufacturers' Association.

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International Time Recording Co., Toronto, Ont.
Signal Systems, Limited, Toronto, Ont.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

RIM AND FELLOE MACHINERY
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.

RIP SAWING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Sinker-Davis Company, Indianapolis, Ind.
Yates Machine Co., P. B., Hamilton, Ont.

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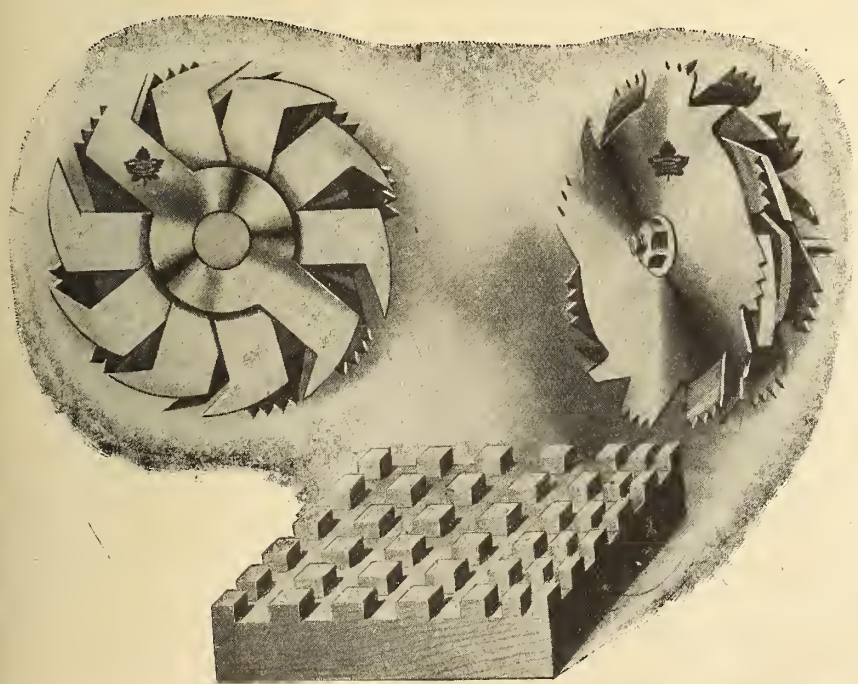
"Maple Leaf" Saws



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Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Nash, J. M., Milwaukee, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

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Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SAWS
Atkins & Co., E. C., Indianapolis, Ind.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Radcliff Saw Mfg. Company, Toronto, Ont.
Shurly-Dietrich, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Smith Co., Ltd., R. H., St. Catharines, Ont.

SAW GUMMERS, ALOXITE
The Carborundum Co., Niagara Falls, N.Y.

SAW SWAGES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Radcliff Saw Mfg. Co., Toronto, Ont.

SAW TABLES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SCRAPING MACHINES
Canada Machinery Corporation, Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass

SCREW DRIVING MACHINERY
Canada Machinery Corporation, Galt, Ont.

SCROLL SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SECOND-HAND MACHINERY
Cowan & Co., Galt, Ont.
Petrie, H. W., Toronto, Ont.
Wayne Machinery Co., Fort Wayne, Ind.

SHAPERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass
Yates Machine Co., P. B., Hamilton, Ont.

SHARPENING TOOLS
The Carborundum Co., Niagara Falls, N.Y.

SHAVING COLLECTORS
Sheldons Limited, Galt, Ont.

SHOOK BUNDLER
Neilson & Company, J. L. Winnipeg, Man.

SPRINGS FOR UPHOLSTERY
Foster Bros. Mfg. Co., Utica, N.Y.

STAINS
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

STEAM APPLIANCES
Darling Bros., Montreal.

SINGLE SPINDLE BOXING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

STAVE SAWING MACHINE
Whitney & Sons, Baxter D., Winchendon, Mass.

STEAM TRAPS
Canadian Morehead Mfg. Co., Woodstock, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

STEEL BOX STRAPPING
Acme Steel Goods Co. of Canada, Ltd.

STEEL SHELL BOX BANDS
Acme Steel Goods Co. of Canada, Ltd.

SURFACERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

SWING SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

TABLE LEG LATHES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Mattison Machine Works, C., Beloit, Wis.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

TABLE SLIDES
Walter & Co., B., Wabash, Ind.

TENONING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

TRANSMISSION MACHINERY
Dodge Mfg. Co., Ltd., Toronto, Ont.

TELEPHONES—PRIVATE SYSTEMS
Signal Systems, Limited, Toronto, Ont.

TRIMMERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

TRUCKS
Sheldons Limited, Galt, Ont.
National Dry Kiln Co., Indianapolis, Ind.

TUNGSTEN LAMPS
Canadian Laco Philips Co., New York and Toronto.

TURNING MACHINES
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Mattison Machine Works, C., Beloit, Wis.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

UNDER-CUT SELF-FEEDING FACE PLANER
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

VARNISHES
Ault & Wiborg Company, Toronto, Ont.

VARNISH SPRAYERS
DeVilbiss Mfg. Co., Toledo, Ohio.

VENEERS
Acme Veneer & Lumber Co., Cincinnati, Ohio.
Barnaby, Chas. A., Greencastle, Ind.
Central Veneer Co., Huntington, W. Virginia.
Clark Veneer Co., Walter, Grand Rapids, Mich.
Empire Veneer Company, Chicago, Ill.
Hartzell, Geo. W., Piqua, Ohio.
Hoffman Bros. Company, Fort Wayne, Ind.
Geo. Kersley, Montreal, Que.
Nartzik, J. J., Chicago, Ill.
Ohio Veneer Company, Cincinnati, Ohio.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Roberts Veneer Co., New Albany, Ind.
Toronto Veneer Company, Toronto, Ont.
Waetjen & Co., George L., Milwaukee, Wis.

VENEER TAPE
Ideal Coated Paper Co., Brookfield, Mass.

VENTILATING APPARATUS
Sheldons Limited, Galt, Ont.

VENEER JOINTERS
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.

VENEER PRESSES (Hand and Power)
Canada Machinery Corporation, Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Perrin & Company, Wm. R., Toronto, Ont.

VISES
Fay & Egan Co., J. A., Cincinnati, Ohio.

WAGON AND CARRIAGE MACHINERY
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass
Yates Machine Co., P. B., Hamilton, Ont.

WATCHMAN'S CLOCKS
Signal Systems, Limited, Toronto, Ont.

WOOD FINISHES
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

WOOD PULLEYS
Dodge Mfg. Co., Ltd., Toronto, Ont.

WOOD TURNING MACHINERY
Canada Machinery Corporation, Galt, Ont.
Defiance Machine Works, Defiance, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Waymoth & Co., A. D., Fitchburg, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

WORK BENCHES
Fay & Egan Co., J. A., Cincinnati, Ohio.

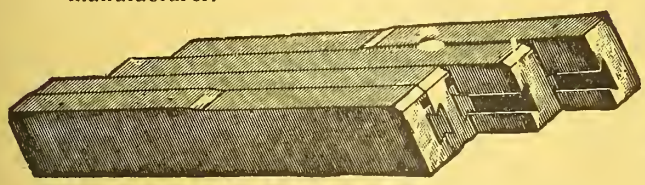
WOOD TURNINGS
Toy Products Co. of Canada, Farm Point, Que.

WOODWORKING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Elliot Woodworker Limited, Toronto, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Reynolds Pattern & Machine Works, Moline, Ill.

WHEELS, Grinding, Carborundum and Aloxite
The Carborundum Co., Niagara Falls, N.Y.

Making TABLE-SLIDES is a Specialty Business

For more than TWENTY-FIVE YEARS we have made TABLE SLIDES exclusively. Our Factory is equipped with Special Machinery which enables us to make SLIDES,—BETTER and CHEAPER than the furniture manufacturer.



Canadian Table makers are rapidly adopting WABASH SLIDES

Because { They ELIMINATE SLIDE TROUBLES / Are CHEAPER and BETTER

Reduced Costs / **Increased Out-put** { BY USING **WABASH SLIDES**

MADE BY

B. Walter & Company

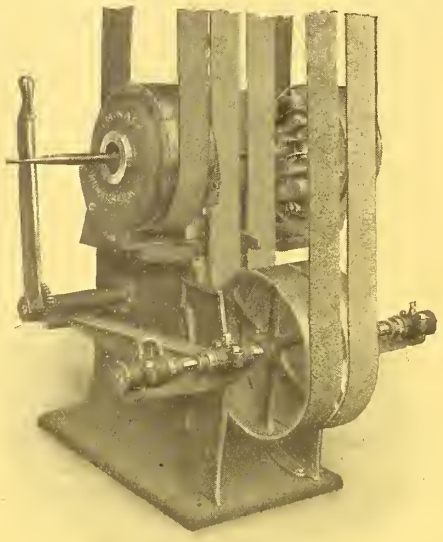
Wabash, Ind.

The Largest EXCLUSIVE TABLE-SLIDE Manufacturers in America

ESTABLISHED-1887

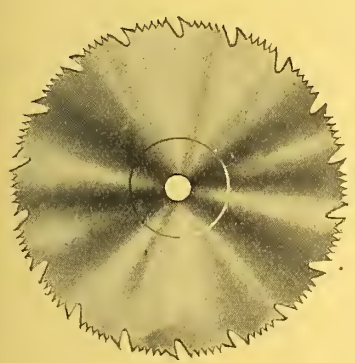
IT CAN TAKE THE PLACE OF

FIVE MEN



One boy and the Nash Sander has done the work of five men with hand belts in many a factory. Might do it for you.

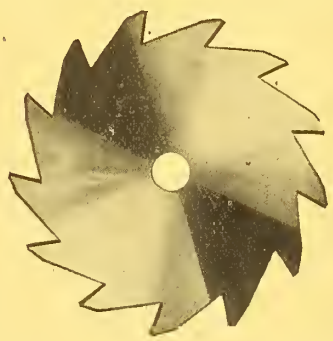
J. M. NASH, MILWAUKEE, Wis.



ATKINS

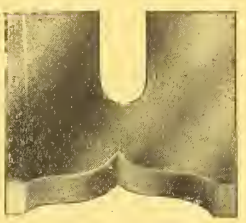
STERLING QUALITY

SAWS and KNIVES



The best steel—the most careful and accurate workmanship—the equipment that will eventually save you money.

Atkins Sterling Quality Saws and Knives are proving their superiority by competitive tests in the largest plants of the country. We welcome your most careful investigation, as we know the satisfaction that will result.



Write to-day for our Knife Booklet "C W" and Pattern Template Paper.

E. C. ATKINS & CO.

Makers of Sterling Saws

Factory—HAMILTON, Ont. **Vancouver Branch—109 Powell Street**

—a Battery of "Automatics" at Stickley's

Furniture plants as efficient and modern as that of Stickley Bros., Grand Rapids, are few and far between. This firm permits no "half way spirit" in any part of its organization—it is noted for doing things on a big scale.

The fact that they now run four Mattison Lathes and keep them busy every minute shows to what extent they produce turned work—and the fact that our machines were chosen to "fill the bill" is convincing evidence that nothing better was to be had.

MATTISON
Automatic
The Standard Shaping Lathe
OVER 2000 IN USE

These "AUTOMATICS" can produce round turnings in one-tenth to one-fifth the time required on the hand lathe—squares and octagons in one-thirtieth to one-tenth the time required by band saw and shaper methods. And in the matter of design, they have outstripped the possibilities of hand-turning so far that many of today's most popular designs could not be attempted by any other method even if cost were not a consideration.

The Mattison "AUTOMATIC," moreover, is practical in **any** plant, because its simplicity enables any ordinary mechanic to operate it and because small quantities as well as large may be run through economically.

Our new descriptive circular on this machine will be sent to any one interested.

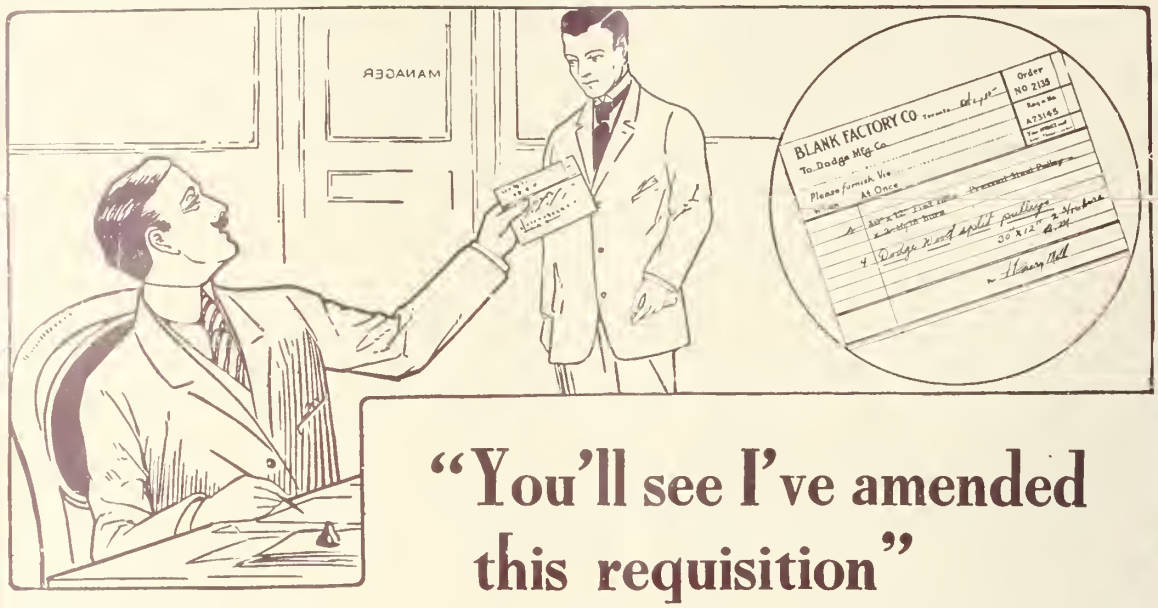
C. Mattison Machine Works

883 FIFTH STREET, BELOIT, WIS.

CANADIAN WOODWORKER and Furniture Manufacturer

Furniture Production Number

Vol. 17 No. 10 Toronto, October 1917



"You'll see I've amended this requisition"

"I'VE been looking into the matter of reducing our overhead charges—and I find that we can save on our power cost. For instance, I've been reading the report of a scientific test showing the enormous loss from slippage of belts over metal pulleys. It proves that the actual cost per year of running the metal pulleys, as against wood pulleys averages around $5.00 per pulley. So that I have changed your requisition from "Steel Pulleys" to read "*Dodge Wood Split Pulleys.*"

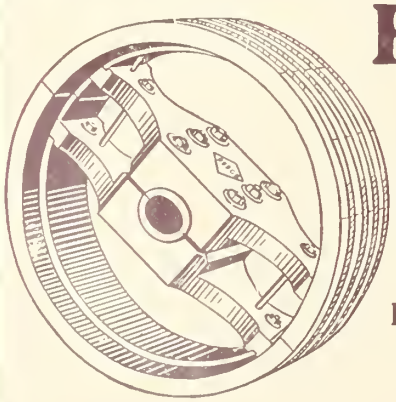
"You will quite possibly find that your mechanical department has acquired a habit of specifying steel pulleys, and I would like you to see personally that *Dodge Wood Split Pulleys* have the call from now on."

We are makers of a full line of Power Transmission Machinery and Elevating and Conveying Machinery

Dodge Standard Lines

Shafting
Couplings
Collars
Iron Pulleys
Rope Wheels
Gearing
Iron Centre Wood Rim Pulleys
Wood Split Pulleys
Counter Shafts
Hangers
Pillow Blocks
Floor Stands
Mule Stands
Belt Tighteners
Friction Clutches
Rope Dressing
Sprockets
Belt Clamps
Boots
Belt Conveyors
Take Ups
Grain Shovels
Car Pullers
Trippers, etc., etc.

DODGE WOOD SPLIT PULLEYS



are 40% cheaper than Metal Pulleys and give 50% greater efficiency

Sole makers in Canada of

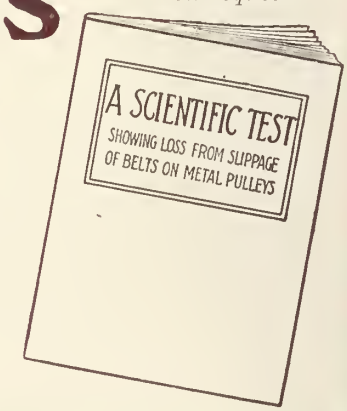
Dodge Standard Wood Split Pulleys

With Interchangeable Bushings

DODGE MANUFACTURING CO., LIMITED

TORONTO

This Book mailed Free on request



6

GARLOCK-WALKER MACHINERY CO. LIMITED

32 FRONT ST. WEST, TORONTO TELEPHONE MAIN 5346

Do You Manufacture Furniture?

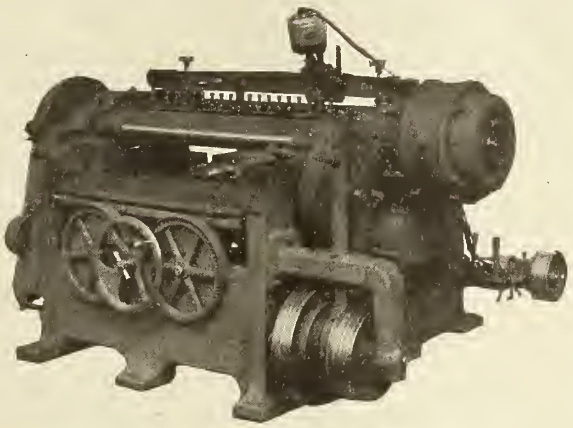
If so, here is the very latest and most up-to-date **SURFACER** for your work — the best, the cheapest in the long run.

Feeds up to 85′ per minute.

Detachable Side Clamping Cylinder Boxes.

Round Cylinder.

Knife Setter and Jointer.



American No. 444 Single Furniture Planer

Infeed Rolls and Chipbreaker either solid or sectional.

Feed Rolls of large diameter—all powerfully driven.

Bed raises and lowers on long inclines.

Heavy Strong Durable

Does the best work at minimum expense

Let us take this up with you in detail — as well as offer you OTHER TOOLS OF LIKE CALIBRE FOR YOUR WORK.

WRITE FOR PRICES AND DELIVERIES

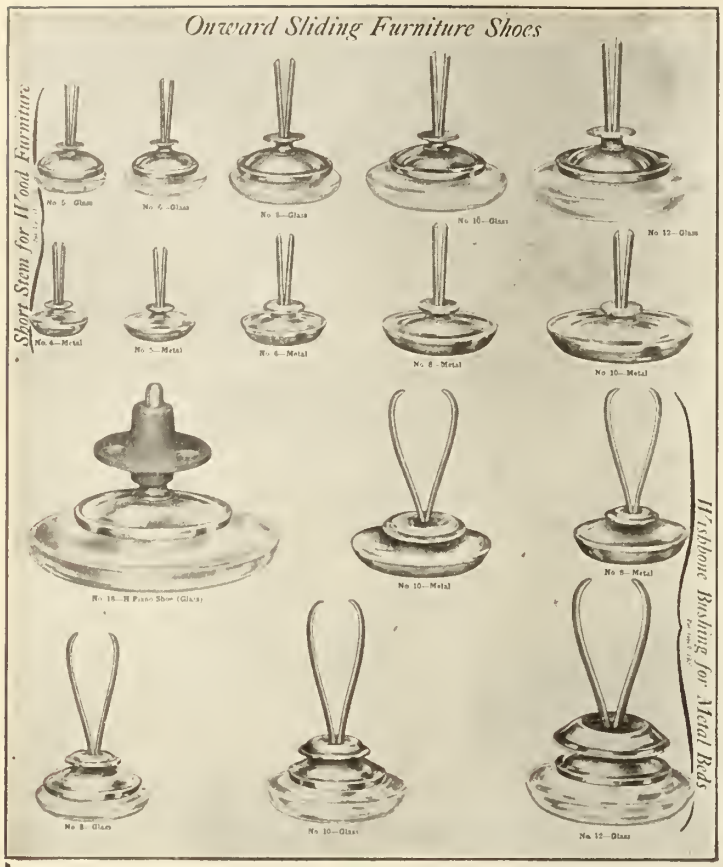
Garlock-Walker Machinery Co., Limited

Canadian Representatives

American Wood Working Machinery Co.
ROCHESTER, N.Y.

M. L. Andrews & Co.
CINCINNATI, OHIO

METAL and WOODWORKING MACHINERY of all Kinds



The Onward

Sliding Furniture Shoe

(Successor to the old fashioned wheel Caster)

The caster has had its day. Onward Sliding Furniture Shoes have come to stay. They are very much more superior in every respect. They are made in all sizes and styles, suitable for all kinds of Furniture. Made with Glass Base and Mott Metal Base. Do no damage to carpets or floors. Easily attached, no sockets required.

Special prices to manufacturers in quantities

Free descriptive circular upon request

MADE IN CANADA BY

Onward Manufacturing Co. - Kitchener, Ont.

Pulls Knobs Escutcheons Toilet Hinges Commode Buttons Hooks Arm and Panholders Pans Desk Slides Casters

Screws Nails Brads Chair Rods and Bolts. Hanger Bolts Lag Screws

Tacks Twine Webbing Upholsterers Nails and Tools Tow Burlap Glue

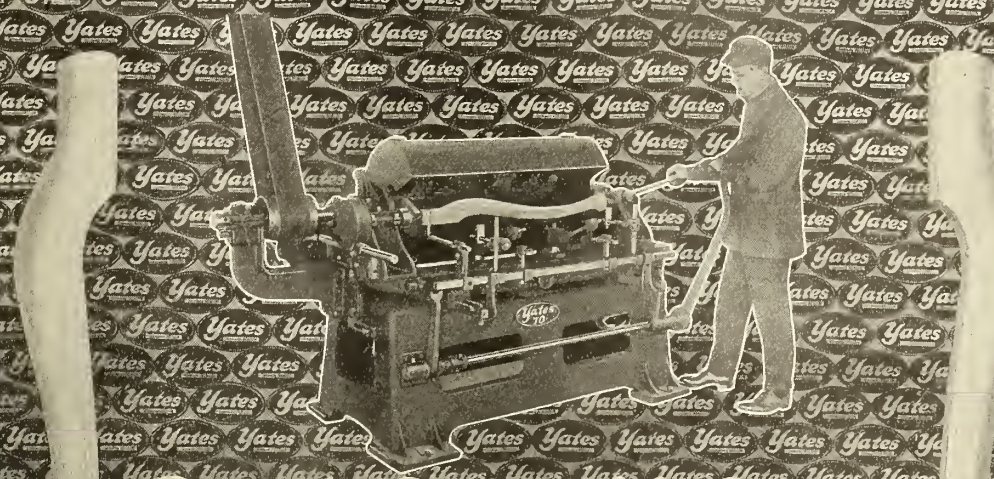
WE assemble the products of the best factories in our line covering Furniture Factory needs. That is why we can give You a price, an intelligent opinion and a delivery, and save You money, time and mistakes. We call attention to new line of Period Trimmings.

Samples and prices cheerfully sent.

NOBLIT BROS. & CO., Inc.

Established 1849 **PHILADELPHIA, Pa., U.S.A.** Incorporated 1917

Locks Keys Jack Chain Shelf Supports Springs Staples Sand Paper and Cloth Seats Benches Clamps Dowels



Turns the Patterns of the Present

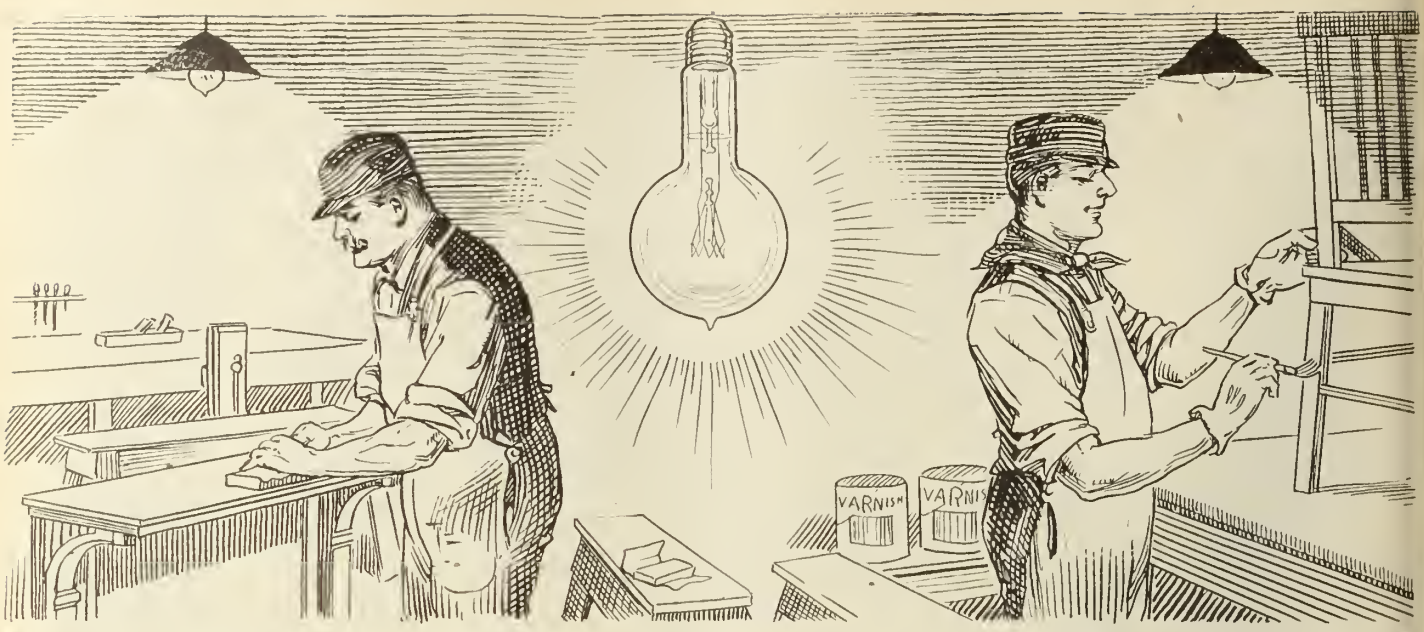
The Yates Automatic Turning Machine will turn automatically, any of the Period patterns now selling. It is adapted to the making of practically any turning. It is a standard tool for wood-working establishments—one that can be used through a long period of years. As a piece of necessary equipment there is none better than the

Yates Automatic Turning Machine

It is simpler than any other. It can be adjusted more quickly. Less operating skill is required. It will do anything a turning machine can do, do it better, and, with ordinary care, will wear longer. More than this, the price is attractive.

Let us show you what we say is true. Ask for our free circular, "Period Patterns."

P. B. Yates Machine Company Ltd.
HAMILTON, ONT. CANADA



GOOD LIGHTING

Adds to Quality and Increases Production

As the hours of daylight grow shorter every factory superintendent is faced with the problem of efficient artificial lighting.

In every department of the woodworking industry quality often depends upon a sufficient amount of clear, bright light. A light that floods the shop with the soft brightness of daytime and makes it possible for workmen to maintain daytime accuracy throughout the full 8-hour day or even in the night shift.

In Fitting, Polishing, Veneering, Enameling, Carving, Upholstering or Color Matching, accuracy of workmanship largely governs the quality.

LACO NITRO LAMP—"The Light That Gives MORE Light"

brings the equivalent of soft, bright sunlight to your factory. It gives you twenty-four hours of bright, clear, white light for accurate work. It relieves eyestrain, loss of time due to poor lighting, reduces error and accident hazard. Makes your factory cheerful and bright and agreeable for your men.

This wonderful new Laco Nitro Lamp reduces the current consumption. It is the latest development of the tungsten electric bulb. The tungsten filament in the Laco Nitro Lamp is suspended in a nitrogen gas-filled bulb—giving a clearer, whiter and greater light per watt than any other type lamp

Inquire from your nearest dealer.

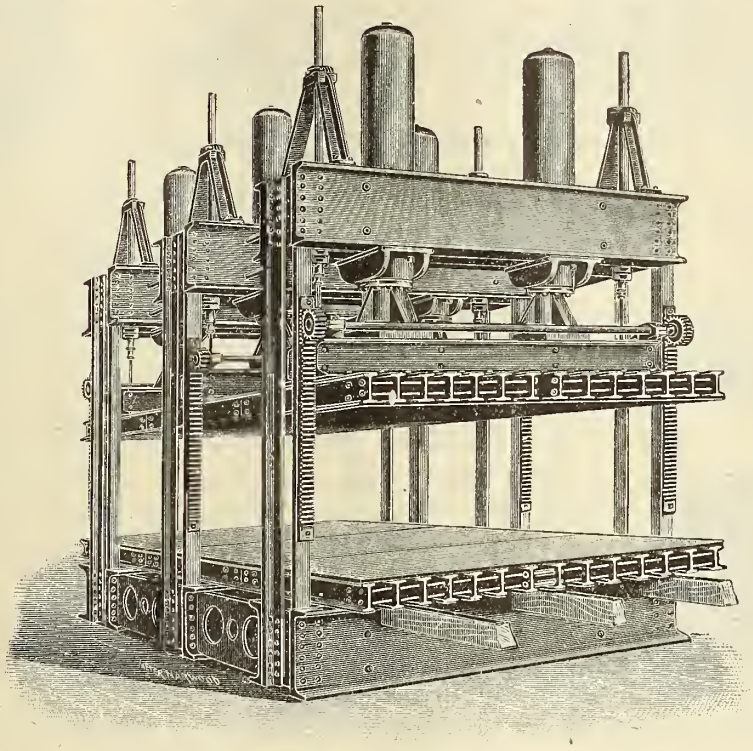
CANADIAN LACO-PHILIPS CO., LIMITED

Stocks available at

MONTREAL, TORONTO, WINNIPEG and VANCOUVER

Veneer Presses

Hydraulic and Belt Driven

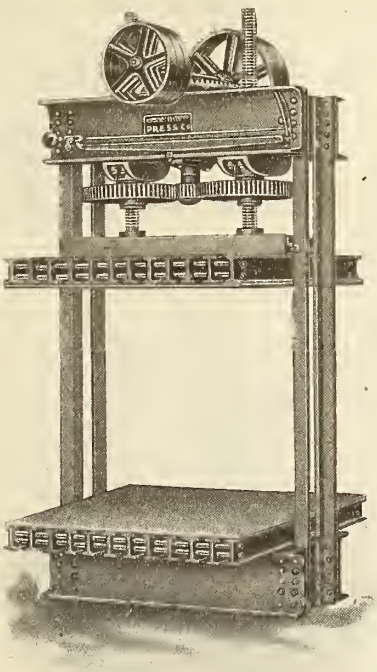


All Styles

All Sizes

Any Pressure

Proposals and Specifications sent upon request.



Special Sizes and Designs built to suit Customers' requirements.

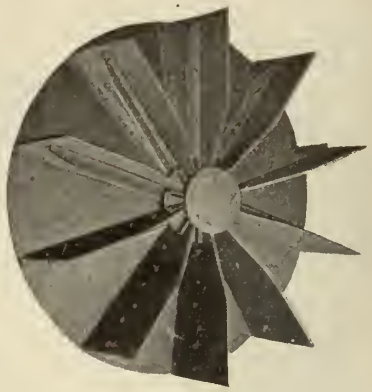
Write for Bulletin C-1.

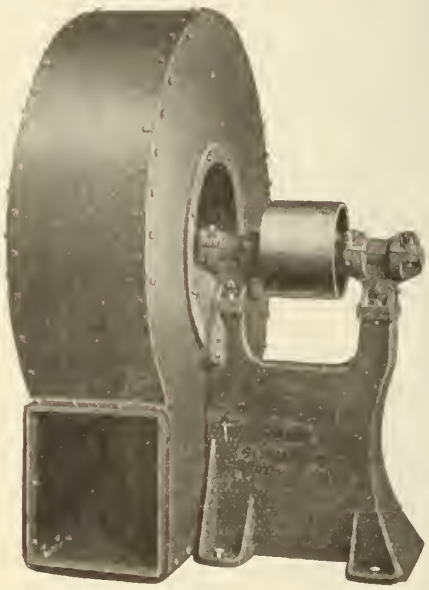
Hydraulic Machinery Co.

Limited

18 Tansley Street - - - MONTREAL, Canada

"CANADIAN"
SLOW SPEED
MILL EXHAUSTERS





How much does it cost you to handle your shavings, sawdust, bark, smoke, gases, fumes, etc.?

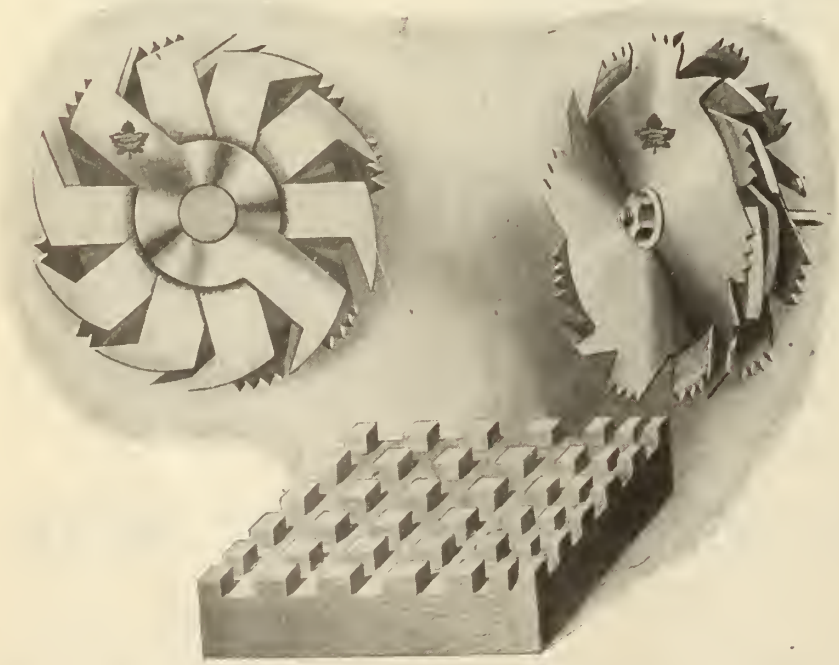
Canadian Slow Speed Reversible Mill Exhausters will save you 15 to 25 per cent.

They are specially designed to do the work required—note the blast wheel for handling long, stringy material.

Our Engineering Department will be glad to help you at any time—and without obligation to you—also be sure to get catalog 256-13.

Canadian Blower & Forge Co., Ltd.
KITCHENER, ONT.

It Pays to Use
"Maple Leaf" Saws



We manufacture—
Bands,
all kinds of
Special Circular Saws
for Special work,
Cross Cut Saws,
Gang Saws,
Grooving Saws,
Chamfering Saws,
Concave Saws,
etc., etc.

EVERY SAW GUARANTEED.
Write for Catalogue

Shurly-Dietrich Co., Limited
GALT — CANADA
Vancouver, B.C. Hull, Quebec

The Planing Counts Most

A planer that does its duty often swings the business up to success—buying a planer merits your deep study.

Fully and frankly, we tell you about

Whitney Planers
Single and Double Surfacers

Their Strong Points appeal to every woodworker:

A rigid frame, with ample weight of metal.

A Bed raised and lowered on solid Wedges.

A hardened Centre Table, made extra thick.

A practical and efficient Sectional Feed Roll.

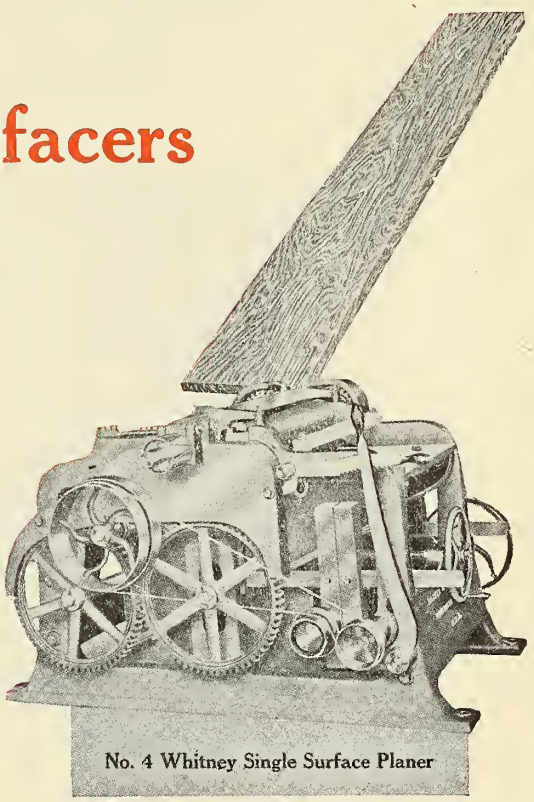
An Automatic Chipbreaker.

Detachable Clamp Cylinder Boxes.

Cutterheads with long Bearings of large diameter.

Machine-cut Gears.

Planers are furnished with Square Cylinders, or Thin Knife Round Cylinders with Grinder and Devices.



No. 4 Whitney Single Surface Planer

Just write us a line.

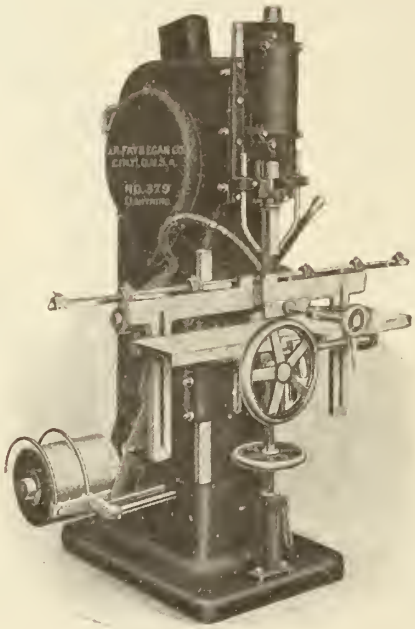
Notice how Whitney Planers are found in woodworking shops that are considered representative.

BAXTER D. WHITNEY & SON, Winchendon, Mass.

H. H. Plummer & Co.
451-453 Monadnock Bldg.
San Francisco, Cal.

Canadian Representatives:
H. W. Petrie, Limited
Toronto, Ontario

Side View



Front View—Plain Table.

—A New Automatic Hollow Chisel Mortiser

FAY-EGAN LIGHTNING No. 379

—carries chisels up to 1 ½" square.

—stroke adjustable from 0 to 5".

—four speeds to chisel ram.

—micrometer set for chisels and augers so you won't break chisels.

—self-contained blower for removing chips.

—all mechanism enclosed.

—bronze bearings.

—plain, compound, or universal table.

—everything you hoped some day to find in your ideal of a mortiser.

Write for Bulletin J-26.

J. A. FAY & EGAN CO.

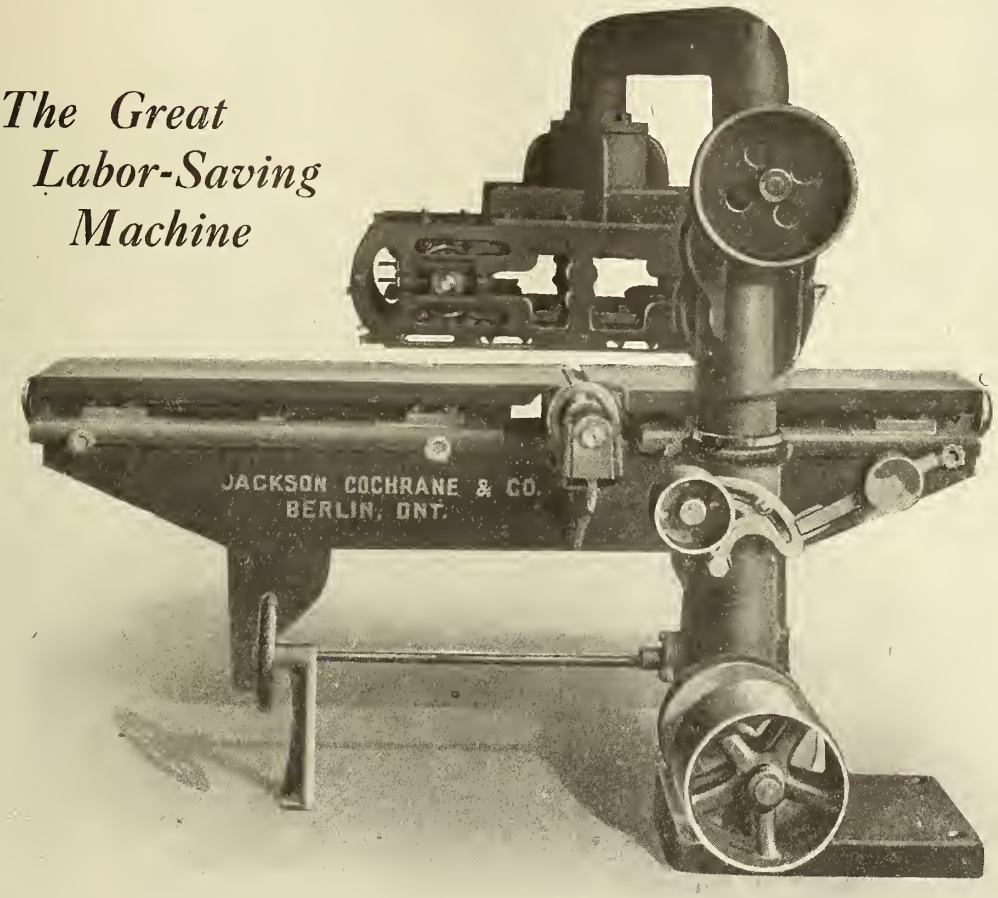
153-173 W. Front Street **CINCINNATI, OHIO**

Increase Your Capacity Four Times

by installing the

Herzog Swing-Out Jointer Attachment

The Great Labor-Saving Machine



Our No. 38 Self-Feed Jointer Attachment, illustrated above, is especially desirable for factories that have but one or two jointers where it is desired to use it for squaring or edging, as the attachment can be quickly swung from the jointer. It does more and better work than four men can do with hand-jointing, can be operated by two boys, will handle stock from one inch wide to the full width of the jointer and produce perfect work. Stock can vary one-half inch in thickness without making any adjustment.

Ask for Bulletin

Jackson, Cochrane & Co., Kitchener, Ont.

Revolving Bed Sander

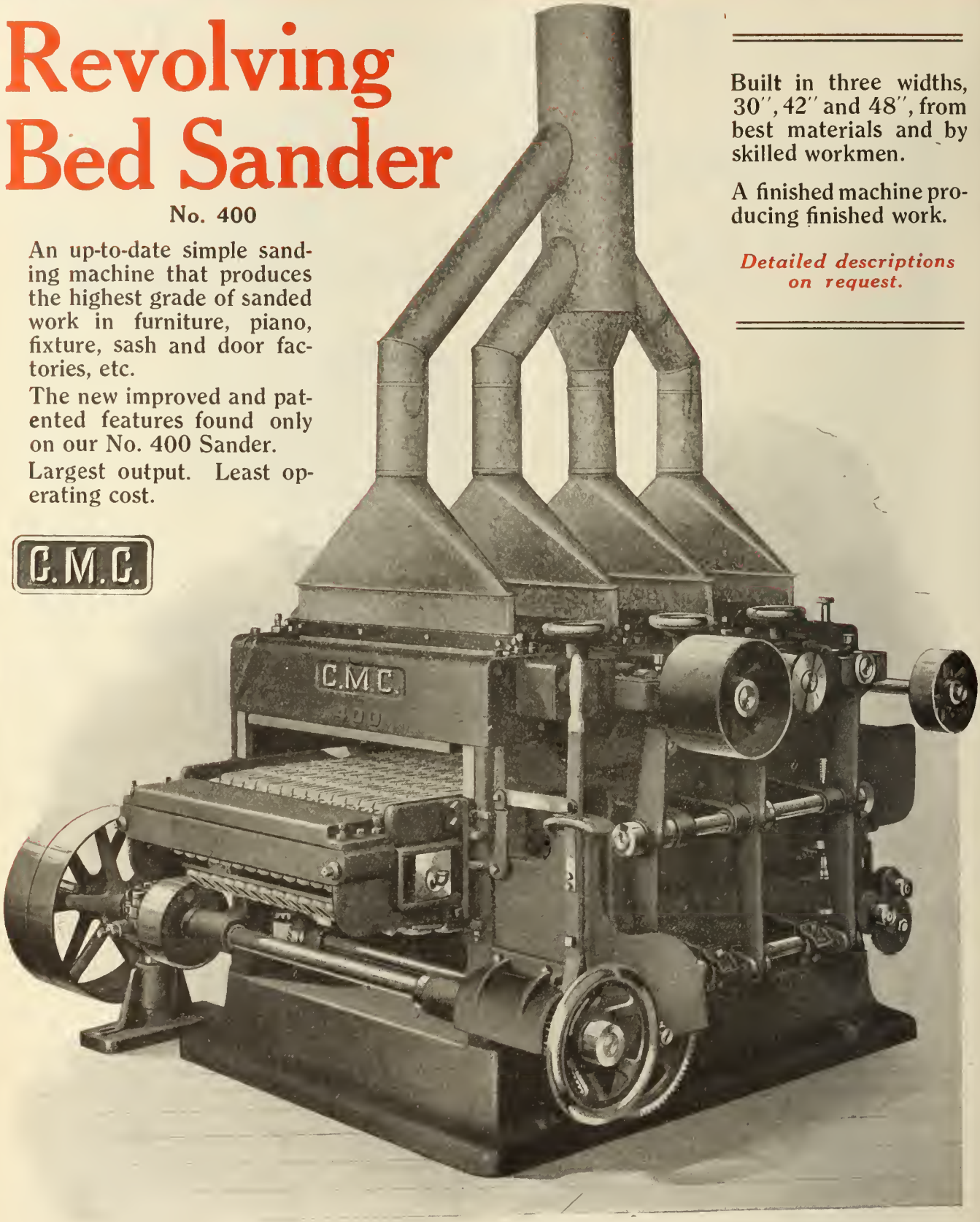
No. 400

An up-to-date simple sanding machine that produces the highest grade of sanded work in furniture, piano, fixture, sash and door factories, etc.

The new improved and patented features found only on our No. 400 Sander.

Largest output. Least operating cost.

C.M.C.



Built in three widths, 30″, 42″ and 48″, from best materials and by skilled workmen.

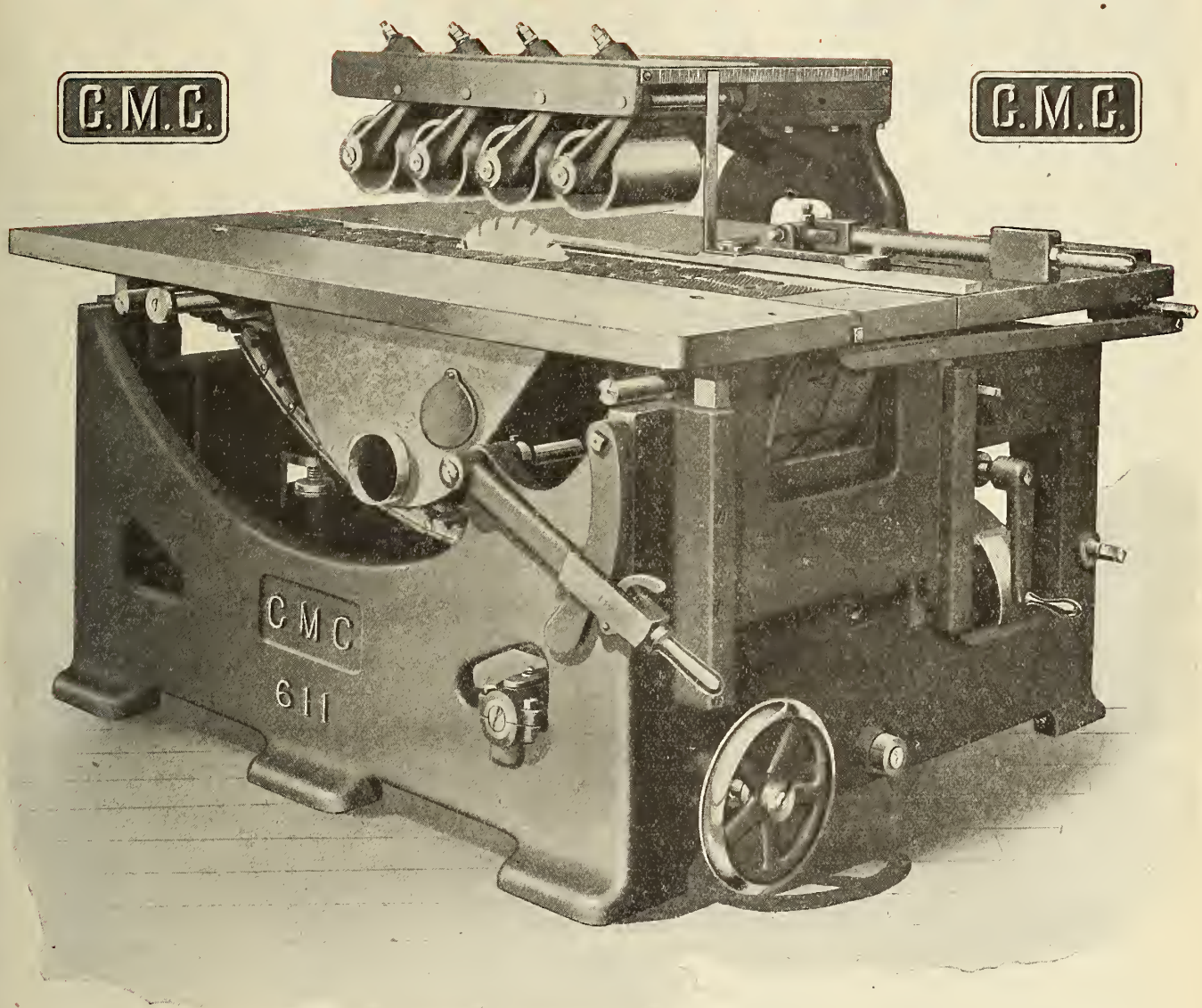
A finished machine producing finished work.

Detailed descriptions on request.

CANADA MACHINERY CORPORATION

TORONTO OFFICE—Brock Ave. Subway GALT, ONT. LIMITED

Jointing Machine



No. 611 Straight-Edging and Jointing Machine

An accurate ripping and jointing machine of proved worth. It has many new features that make it simple to operate and adjust, and produce the very best class work.

Detailed descriptions and illustrations on request.

CANADA MACHINERY CORPORATION
GALT - ONTARIO LIMITED

TORONTO OFFICE—Brock Avenue Subway.

MAKING Thin High Speed Steel Knives that will live up to the claims made for them is a task that requires the experience, long careful study and the factory equipment such as is enjoyed by the Simonds Canada Saw Company.

It may cost a little more to make a Simonds Knife but the Simonds Knife is worth a great deal more since it gives such satisfactory results in running up to capacity of the fastest machines.

After all, Knife satisfaction is what you want, isn't it?

Send orders for Simonds Regular Planer Knives—high grade, finely tempered, carefully balanced—to our nearest branch office.

Simonds Canada Saw Co., Limited

St. Remi Street and Acorn Ave.
MONTREAL, QUE.

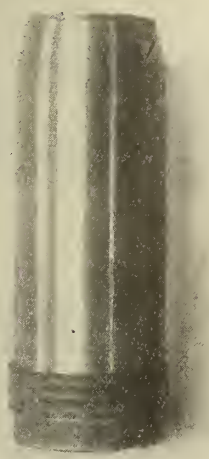
Vancouver, B. C. St. John, N. B.

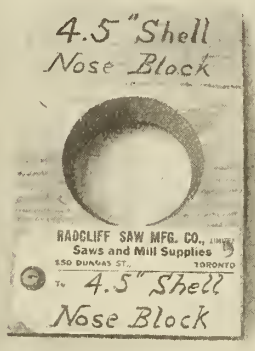
BEAVER BRAND

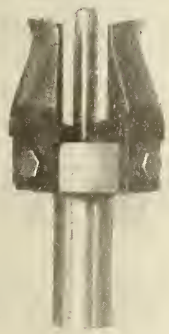
"THE FIRST WOODCUTTER" TRADE MARK REGISTERED

Cut Down Your Manufacturing Costs

Radcliff Cylinder Saws for Shell Boxes



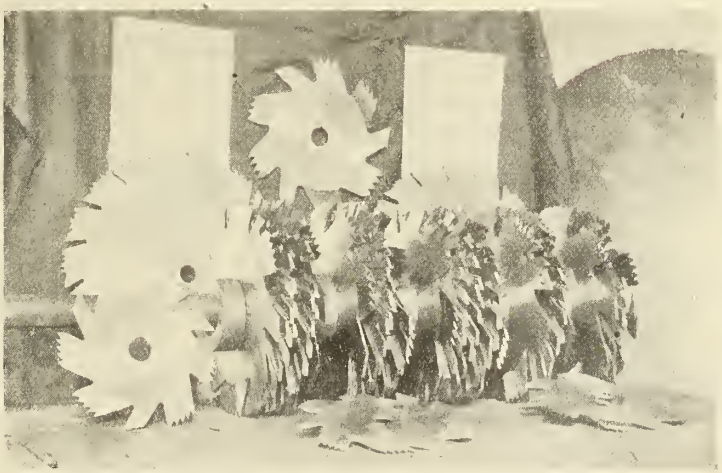




The illustration shows the special taper cutter used for the Nose blocks of the 4.5 in. and Bethlehem Boxes. These cutters will do quick smooth work and cut hole through and taper sides all in one operation. The kicker will eject the core. The shank can be made to fit any chuck over ¾ in. diameter, but we prefer to make them to fit over end of boring machine spindle where possible. Extra knives can be supplied to renew worn ones.

Get our prices.

SPECIAL "BEAVER" DADO



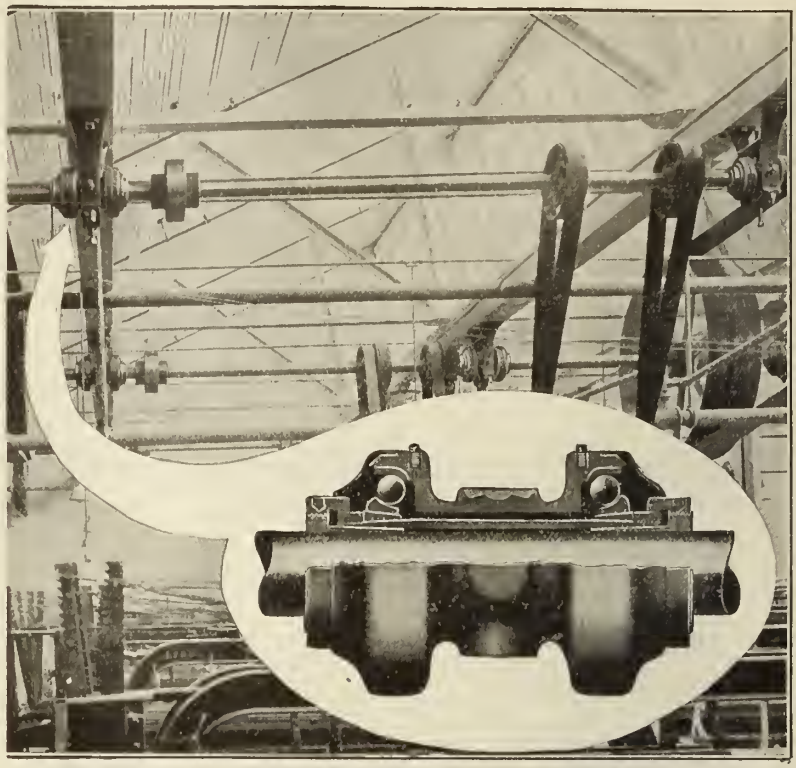
Specially designed to cut with or across the grain, leaving a smooth, clean surface. Indispensable in the manufacture of furniture and boxes

This special "Beaver" Dado was designed to meet the requirements of furniture or box manufacturers. Its particular construction eliminates the trouble previously experienced by many manufacturers in cutting across the grain. The above illustration shows one complete order recently shipped to a shell box manufacturer. It consists of five "Beaver" Dados from 1¼ in. to 2 in. wide, also two special Planer Saws for cutting off box stock. The small groover shown in illustration is to cut slot for wire handle or for string for the cover. Get our prices on these saws—it will be worth your while.

THE RADCLIFF SAW MFG. CO., LIMITED 1550 DUNDAS ST. TORONTO, ONT.

Agents for L. & I. J. White Co., Machine Knives

You Have Paid for an Installation of



Chapman Double Ball Bearings

In Your Factory, over and over again, BUT—

Have You Got Them?

Ordinary line shafting wastes from 15 per cent. to 60 per cent. of power.

Line shafting equipped with Chapman Double Ball Bearings will eliminate about 75 per cent. of the friction, thus averaging a total saving of from 15 per cent. to 30 per cent.

Over 2,000 Canadian factories are making this saving every day. They have installed Chapman Double Ball Bearings. Every one of these factories is a working testimonial of their efficiency.

Chapman Double Ball Bearings will increase the power from your present power plant or decrease the cost of operating that same plant if extra power is'nt required.

Chapman Double Ball Bearings fit any adjustable hanger and require oiling and attention only once a year. No extra equipment required to install.

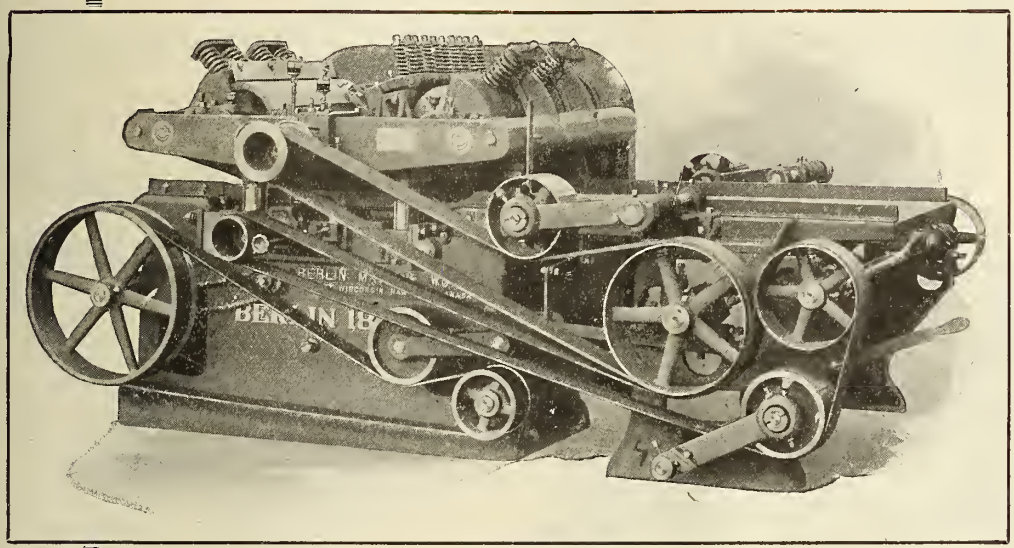
Write to-day for full particulars

The Chapman Double Ball Bearing Co. of Canada, Limited

Toronto 339-351 Sorauren Ave. **Ontario**

American Branch: The Transmission Ball Bearing Co., Inc., 1050 Military Road, Buffalo, N.Y.

"CROWN" PLANER BELTING



Gives Real Efficient Service Under This Seven Pulley Test

Think it over. Here is a belting which is giving maximum efficiency and no compromise.

This is why we want you to put it to the same test — perhaps even more difficult. Let it prove to you as it has done to hundreds of others that it will solve the high speed heavy duty problems—that it will give you maximum possible transmission of power.

"Why do we know it will do this?"—because SADLER AND HAWORTH make belting from the highest grade of leather, carefully selected and tanned by ourselves—there's no flaws in "Crown" Planer Belting.

"Leather like gold has no substitute."

Sadler & Haworth

ESTABLISHED 1876

Tanners and Manufacturers

For 40 years Tanners and Manufacturers of the Best Leather Belts

Toronto	St. John, N.B.	MONTREAL	Winnipeg	Vancouver
38 Wellington St. E	149 Prince William St.	511 William St.	Galt Building	111 Water St.

Ammunition Box Bands

Shingle Bands **Hot Rolled Hoop** **Cold Rolled Hoop**

Sheared Bands from Sheet Steel,

Black or Galvanized in gauges of 20 to 30. Any width. Any length in inches or fractions thereof up to 96 inches in length.

PROMPT SHIPMENTS FROM STOCK

American Steel Band Co. - N.S., Pittsburgh, Pa.

The New Hoosier Self-Feed Rip Saw

This is our Standard or No. 1 Hoosier Self Feed Rip Saw, which is now built with hinged upper feed works so that they can be quickly and easily raised up out of the way and the machine used for hand-feed work.

The machine is capable of ripping as thick as 6 in. and as wide as 20 in., and can be used for single, gang, or bevel ripping, the feed being strong enough to pull six saws through 1 in. stock. Four rates of feed are provided from 35 to 150 ft. per minute.

To take care of special ripping problems we build Hoosier Rip Saws in seven other styles.

For further information address

The—

Sinker-Davis Company

INDIANAPOLIS, IND.

Galbraith & Co., Ltd.

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Manufacturers of

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Toys, Games, Turned Goods and Kitchenware

We Specialize on

CUSTOMS TURNINGS

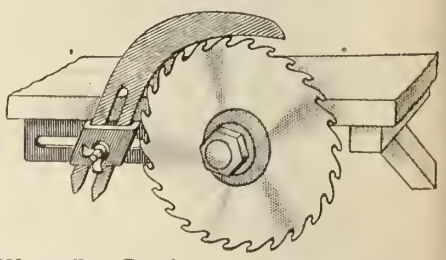
Your order will receive prompt attention

WHY PAY MORE?

The CHEAPEST and SIMPLEST

SPLITTER SAW GUARD

Does the work for saws of any diameter



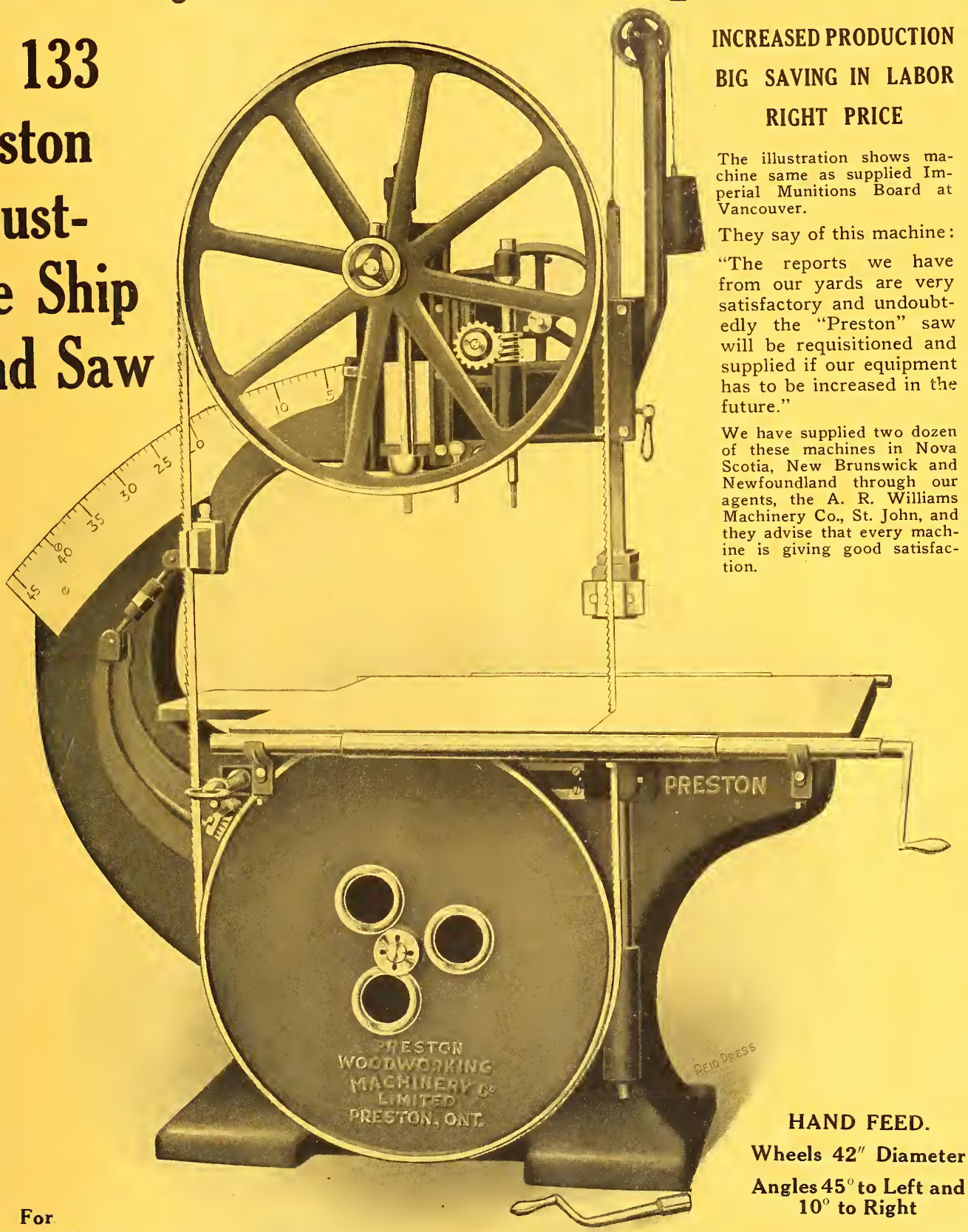
Write For Catalogue

Gustafson & Scott Mfg. Co.

4315 Wabansia Ave. (NOT INC.) CHICAGO, ILL.

A Money Maker for Shipbuilders

No. 133 Preston Adjustable Ship Band Saw



INCREASED PRODUCTION

BIG SAVING IN LABOR

RIGHT PRICE

The illustration shows machine same as supplied Imperial Munitions Board at Vancouver.

They say of this machine:

"The reports we have from our yards are very satisfactory and undoubtedly the "Preston" saw will be requisitioned and supplied if our equipment has to be increased in the future."

We have supplied two dozen of these machines in Nova Scotia, New Brunswick and Newfoundland through our agents, the A. R. Williams Machinery Co., St. John, and they advise that every machine is giving good satisfaction.

HAND FEED.

Wheels 42″ Diameter

Angles 45° to Left and 10° to Right

Ask for Circular

For Power Feed Machine See Next Page

The Preston Woodworking Machinery Co., Limited

Sales Agents: A. R. Williams Machinery Co., St. John, Vancouver and Toronto.

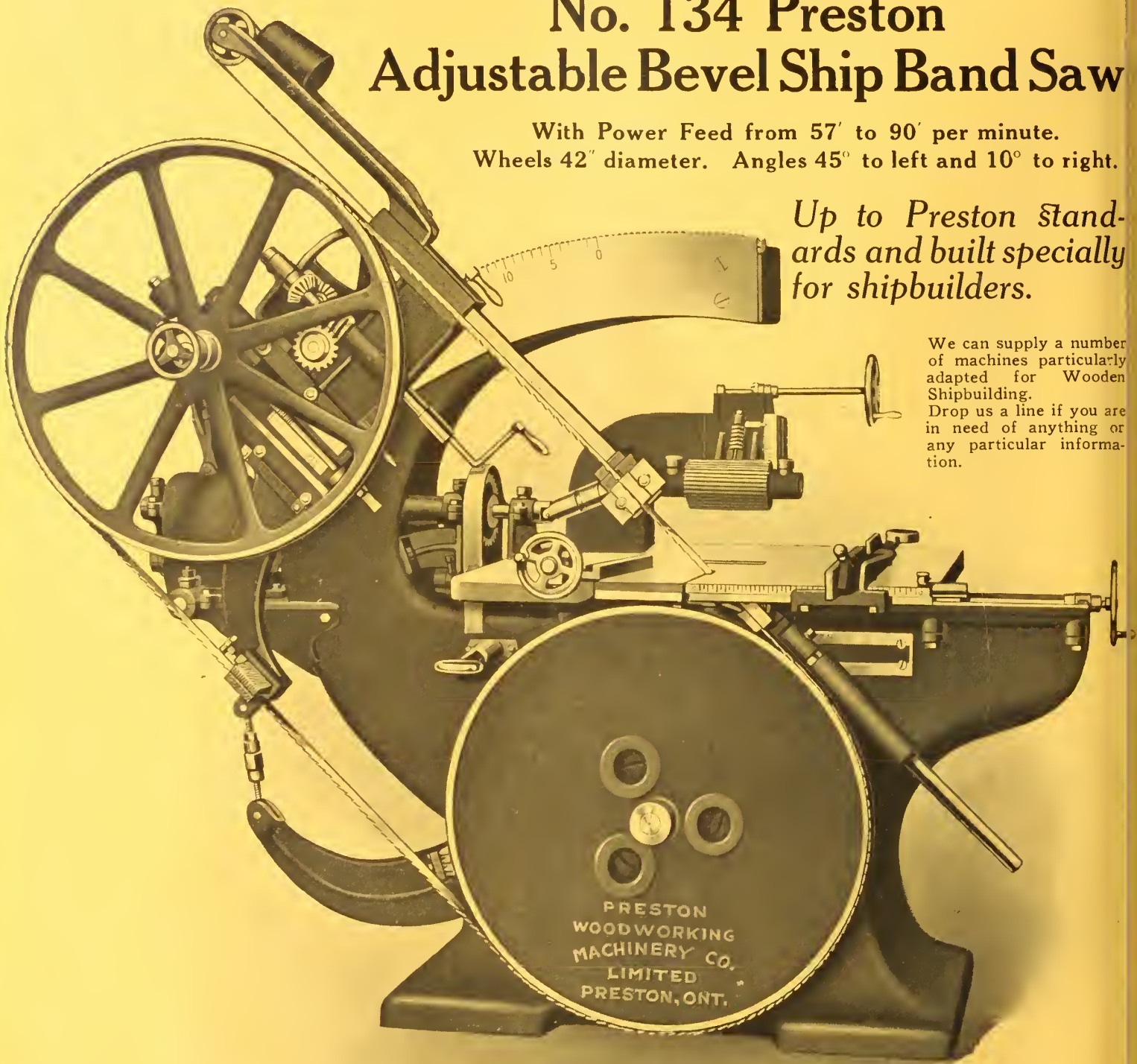
PRESTON, ONT.

Another Excellent Machine

No. 134 Preston Adjustable Bevel Ship Band Saw

With Power Feed from 57′ to 90′ per minute.
Wheels 42″ diameter. Angles 45° to left and 10° to right.

Up to Preston standards and built specially for shipbuilders.



We can supply a number of machines particularly adapted for Wooden Shipbuilding.
Drop us a line if you are in need of anything or any particular information.

Ask us for cut of our No. 123 30″ Surface Planer particularly adapted for Shipbuilding Purposes

The Preston Woodworking Machinery Co., Limited

Sales Agents: A. R. Williams Machinery Co., St. John, Vancouver and Toronto.

PRESTON, ONT.

The "Shimer Limited" Expansion Head

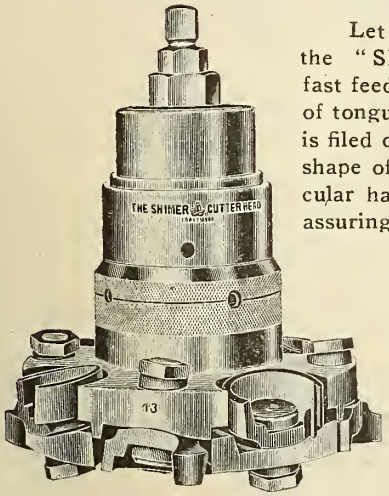


Fig. 627

Let us draw your attention to the advantages of using the "SHIMER CUTTER HEAD" for general Mill and fast feed Planer work. The Cutter is turned to cut the shape of tongue and groove desired, so that to sharpen the cutter it is filed or ground on its face, guaranteeing the user the same shape of cut during the life of the cutter. The bit being circular has from 3½ in. to 5 in. cutting length to the cutter, assuring long wearing life to the cutters.

Note that the cutter, being fastened to a concave seat on a compound angle, assures the user of the proper clearance of cutters, consequently they never burn.

These heads are fitted with or without the Self-Centering Sleeve, and made Expansion or Solid, to suit the customer's wishes.

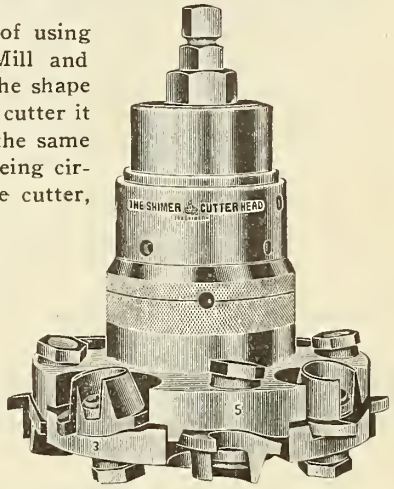


Fig. 268

Shimer Heads have been in use for sixty years, and their reliability and reputation have spoken for them in the past. Let us know your wants and we will guarantee their reliability at the present.

SHIMER CUTTER HEAD CO. OF CANADA, LIMITED

Successors to Samuel J. Shimer & Sons, Inc.

GALT, ONTARIO

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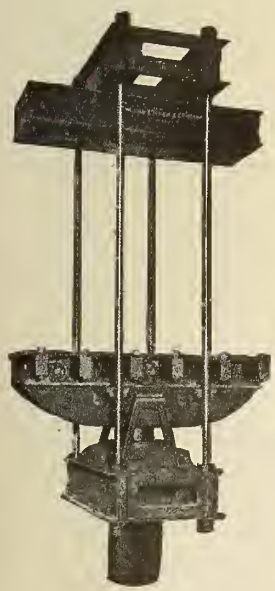
Made in Canada



Presses for Every Purpose

Hydraulic, Power, Screw and Filter

William R. Perrin

LIMITED

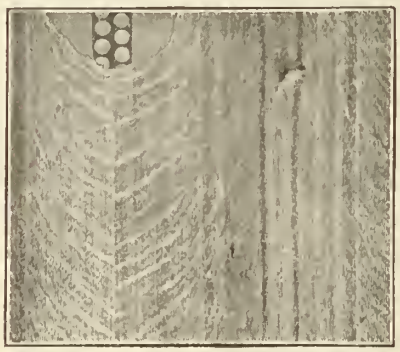
Toronto - Ontario

Veneer Tapes

The greatest value is what every buyer of veneer tapes is looking for. That is why our tapes became so popular and continue to hold the trade against all competitors.

Double Perforated Tape

for Crossbanding



See the perfect joints in the illustration, which is an exact reproduction of a portion of a panel made by a manufacturer who is using this tape regularly. Nothing to compare with it for this work.

"Easimoov"

Patented

for outside work or for specially curved work.

A new tape which was quickly recognized by veneer users as supplying a real demand.

Holds Veneer Perfectly, **yet can be removed instantly** after having served its purpose, without being sanded.

Saves Time, Labor and Expense

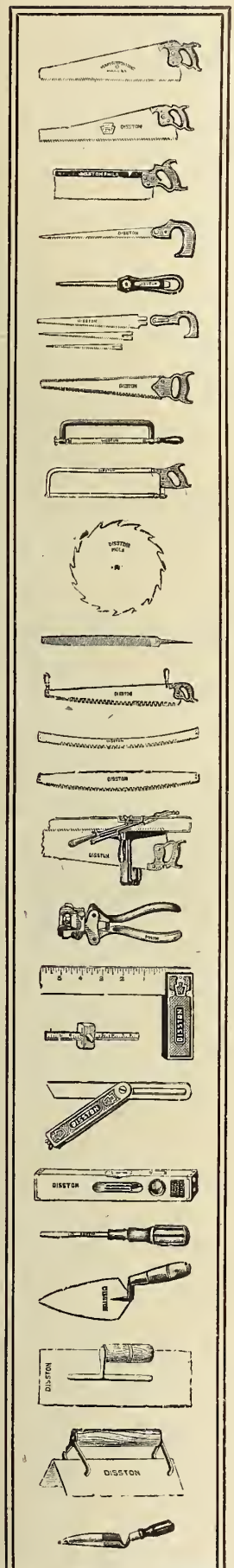
The kind of tape that pleases the operator.

Sample Coils of any of our Veneer Tapes sent to Canadian users on request. Write us now. Profit by our years of experience in this line.

Ideal Coated Paper Co.

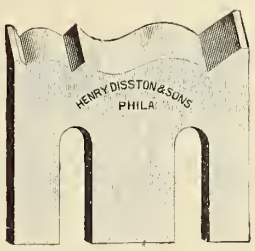
Veneer Tape Specialists

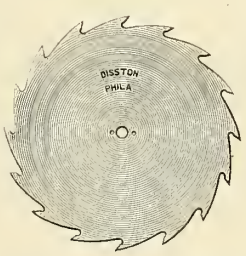
Main Offices and Mills - - **BROOKFIELD, Mass.**



Disston

WE aim to manufacture Disston Goods of a Superior Quality, and at a cost to make them purchasable by all mechanics.





Henry Disston & Sons

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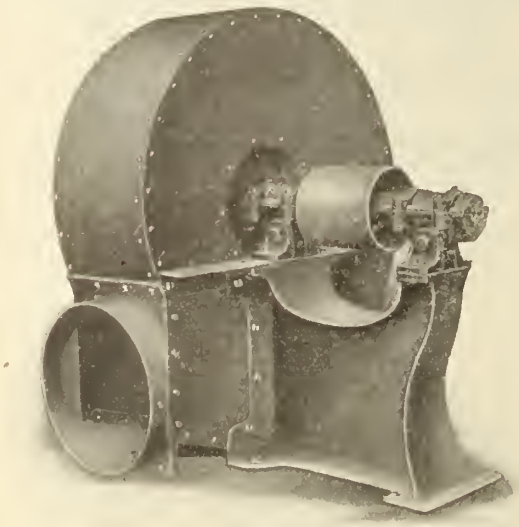
Keystone Saw, Tool, Steel and File Works

Branch: Vancouver, B. C.

Toronto - Ontario

Present Day Competition



and scarcity of labor force the manufacturer to employ modern and efficient machinery.

The expense of removing refuse from your wood working machines will be greatly reduced if you install one of our Slow Speed Exhaust Fans.

Write us for full information on Exhaust Fans and Exhaust Fan Systems.

SHELDONS LIMITED, Galt, Ontario, Can.

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Messrs. Gorman, Clancey & Grindley, Ltd., Calgary and Edmonton, Alta.
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BOX MACHINERY

The high cost of box lumber, materials, labor, etc., makes it necessary to get a maximum capacity out of your factory at a minimum cost for production.

Are you interested in

Increasing Factory Efficiency?
Lowering Labor Costs?
Turning Out Higher Grade Work?

Then you will want a copy of Mereen-Johnson's latest catalog showing many Automatic Labor Saving Machines

"Machines that cut your costs"

Including

AUTOMATIC BOX BOARD SQUEEZERS, HOPPER FEED BOX BOARD RESAWS, VERTICAL RESAWS, BOX BOARD MATCHERS, BOTTLE BOX GROOVERS, HAND HOLD AND RECESSING MACHINES, GANG CLEAT SAWS, TRIMMERS AND EQUALIZERS, CUTOFF AND RIP SAW TABLES, ETC., ETC.

The most complete Line of Box Machines on the market

Write for complete catalog.

MEREEN JOHNSON MACHINE COMPANY

MINNEAPOLIS MINN., U. S. A.

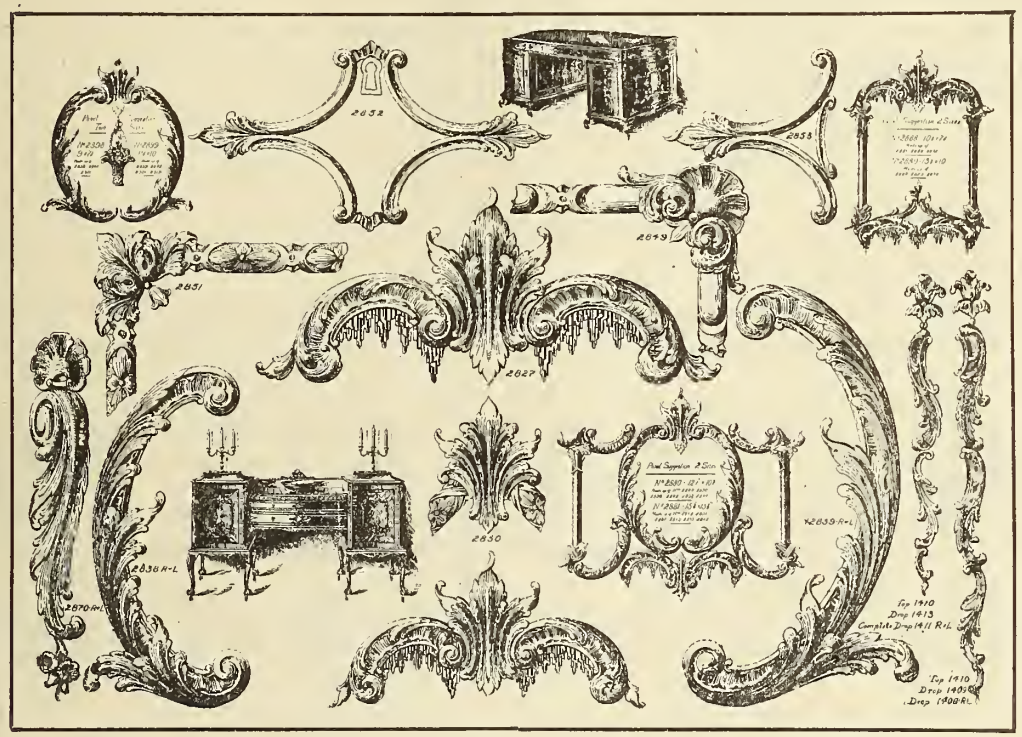
Period Carvings

They are very economical.

You can use them To-day or in Ten years from now.

No steaming required.

Have They Brad Holes ?



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FOR
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National Lock Co., Rockford, Ill.—Furniture, Phonograph and Kitchen Cabinet Hardware.
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THE COMPLETE LINE

IS DISTINGUISHED FOR ITS FINISH

THE ORIGINAL FINISH of the early English furniture, mellowed by age, is extremely beautiful. Not a little of this effect is due to the antique finish of the brass trimmings.

FOSTER MERRIAM & CO. have successfully developed ***"YE OLDE ANTIQUE FINISH"*** and have applied it to their complete line of brass trimmings.

Our Canadian Representative is at your service.

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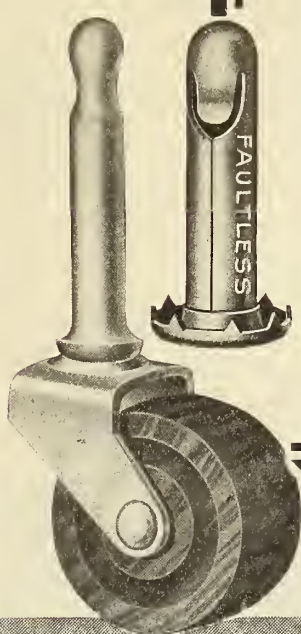
SUPERIOR QUALITY

A line that through consistent merit, has earned a proud reputation in the caster world.

Faultless Pivot Bearing Casters meet the exacting requirements of furniture manufacturers. To every type of installation, Faultless Casters offer the utmost satisfaction in strength, reliability, variety and finish.

Send for "G" catalog just off the press



FAULTLESS CASTER Co.
EVANSVILLE, IND.

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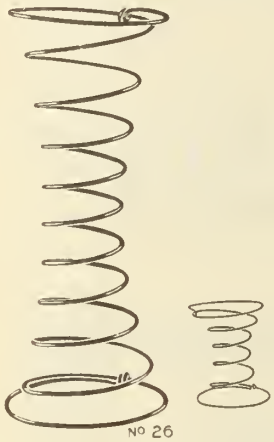
from the most delicate pillow springs to the large comfortable seat springs

Canadian Made for the Canadian Furniture Trade



Steele's Quality Upholstery Springs are tempered, and are guaranteed to retain their original height indefinitely. The line includes two cone springs, single cone springs with any finish on the small end, edge springs with round or square fronts, springs for loose cushions in barrel, two cone or straight compression styles, springs of special strength, knotted or plain ends.

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of upholstered furniture no doubt requires special springs. Refer your problems to us; our experts are at your command.

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Canada's Largest Manufacturers of Wire Springs. Steel, Brass, Phosphor Bronze and Monel Metal

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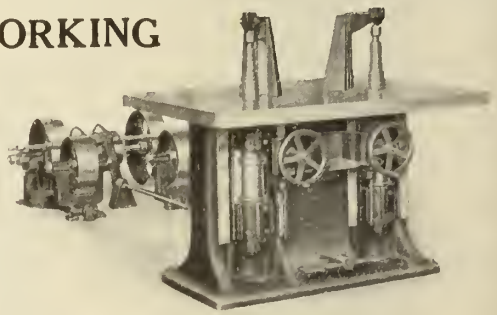
Hand Planer or Jointer

These machines are up to the minute in all particulars and manufactured by the most modern methods backed by over Forty Years' Experience.

We build a complete line of Wood Working Machines that are Cost Reducers and Profit Makers.

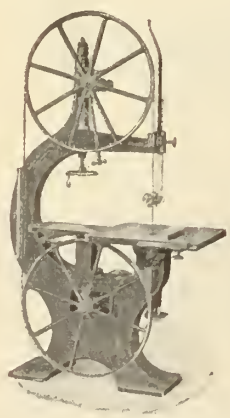
Write for interesting information regarding any of these machines or any other wood working machinery you may be interested in.



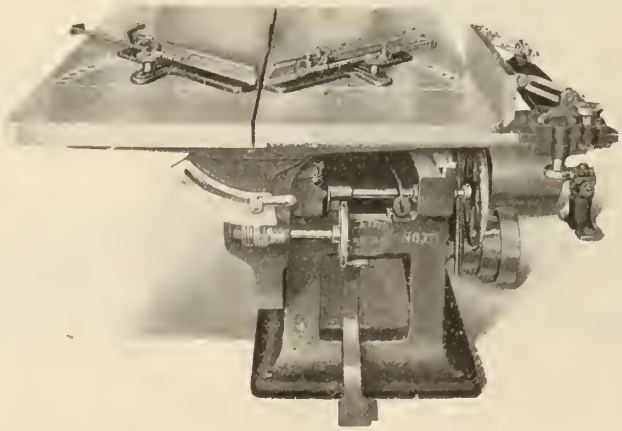
No. 163 Double Spindle Shaper

Hall & Brown Wood Working Machine Co.

1913-1933 N. Broadway, ST. LOUIS, MO., U.S.A.



New Model No. 120 Band Saw



No. 171 Combination Saw

No. 147 Hollow Chisel Mortiser

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St. John, N.B., Winnipeg, Vancouver

Production the Keynote of the Situation

NEVER in the history of modern industrial activity has the importance of production been brought more forcibly to the attention of manufacturers than during the past three years. The insistent call for war munitions of every description has emphasized the importance of this feature in a manner which could not have been done had the need been less vital to our existence.

Standardized Products, High Grade Equipment and an Organized Service are the elements necessary for profitable production. Our forty years' experience has developed a connection with the leading and most up-to-date Woodworking Machinery Manufacturers and an organized Service Department which is capable of offering you valuable suggestions in regard to equipment and methods of manufacture.

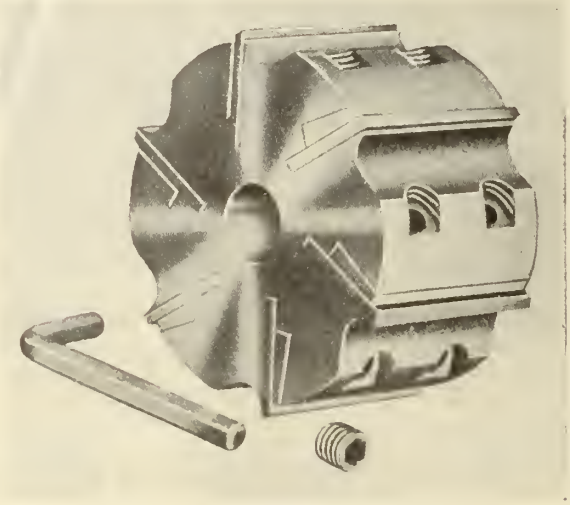
We are organized to take care of your requirements from one side of the country to the other. Write us at Vancouver, Winnipeg, Toronto or St. John, N. B. Our Service is at your disposal.

If it's Machinery—write "Williams"

The A. R. Williams Machinery Co., Limited

64-66 Front Street West, Toronto

Safety High Speed Cutter Head



2, 4 and 6 in KNIVES.

Adapted to use for top, bottom and side heads on moulding, flooring and surfacing machines.

Write for catalog of Machine Knives and Cutter Heads.

E. E. GAGE MFG. COMPANY
301 N. MAIN ST., GARDNER, MASS.

We manufacture a complete line of

Chair, Cane-cutting and Bending Machines

for all classes of work.

L. G. McKnight & Son Co.
Gardner, Mass.

Eliminate Every Chance for Poor Joints
on Highly-Figured End Wood Veneers by Using this Machine.

One of the largest factors in economical manufacturing lies in building the job right the first time.

In testimony thereof:

Evansville, Ind.,
July 12, 1916.

"In regard to the FALLS Veneer Jointer we are using of your make, beg to say that it is giving every satisfaction.

"We are pleased with the work that it turns out, and find that is is not only a saving in labor, but it is a saving in that the work is as it should be, which does away with having to do a part of it over. This, of course, you understand, is an item worth while.

"We are very much pleased with the machine and cannot say that we have any trouble whatever in operating same."

Very truly yours,
THE KARGES FURNITURE CO.

No. 23 Automatic Veneer Jointer.

Falls Machine Co.
Sheboygan Falls - Wis., U.S.A.

Exclusive Canadian Representatives:
Garlock-Walker Machinery Co., Ltd.
32 Front St. West - TORONTO, CANADA

"All that the Word Implies"

We have endeavored to build up an organization which will insure service to our customers, and will make the term, used in connection with the business of Penrod, Jurden & McCowen, really significant. This is our idea of

"P J M SERVICE"

Scientific Drying **Expert Manufacturing**
Good Timber **Modern Mills**
Satisfaction to the Buyer

Southern Rotary Veneers and Hardwood Lumber

We can take care of your requirements in Southern woods, no matter whether you are in the market for veneers or lumber. Our big Rotary Veneer Mill at Helena, Ark., has exceptionally large units, and can readily supply sizes which are ordinarily difficult to produce. Our lumber mills are cutting some of the finest hardwood stock ever manufactured in America. Tell us what you want—we can supply you.

On account of car shortage, which affects delivery of logs to the mills as well as shipments of veneer—we urge all buyers of veneers to place requirements at least 60 to 90 days in advance.

P J M

Penrod, Jurden & McCowen (Incorporated)

General Offices, MEMPHIS, TENN.
Bank of Commerce Building

P J M

116 Walnut Trees

The picture shows one of them. They are situated in Platte County, Mo., and are said to comprise the finest lot of Walnut Timber in the country. It has been handed down by two or three generations without any of the timber being cut.

The purchase of this beautiful stand of choice Walnut trees is indicative of "Penrod" enterprise. From buying the timber to distribution of the lumber, veneers, etc., to users, we give our customers the benefit of thirty years' experience. Immense stocks are always carried, giving an almost unlimited choice of color and figure.

Remember "Penrod Service."

Penrod Walnut & Veneer Co.

KANSAS CITY, Mo.

Saint Francis Basin Band Sawed Oak

Soft Textured, Evenly Colored, Red and White

QUICK SHIPMENT

An Example of Real Service

"We have placed orders for large amount of Gum, with promise of immediate shipment, but it does not get started, for some reason. Now, if you can make a shipment within a week from this time, you may enter our order."

(Two cars were ordered—car numbers wired our customer one hour after receipt of order—cars loaded same day, pulled from our siding early next morning, and will be wire-traced till delivered.)

We are Headquarters for

St. Francis Basin Kraetzer Cured Gum

Send us a list of your requirements. — Delivered Prices will be cheerfully quoted

GEO. C. BROWN & CO.

Mill—PROCTOR, Ark. **Main Office—MEMPHIS, Tenn.**

We specialize in Tennessee Aromatic Red Cedar

RED GUM

("AMERICA'S FINEST CABINET WOOD")

Before RED GUM became recognized as a cabinet wood which manufacturers are proud to use and to tell about, and which *consumers* are proud to own, a good many high-class furniture manufacturers were obliged to call RED GUM by some sort of pretty nickname.

NOW ALL THAT IS CHANGED

The RED GUM producers have spent (and are still spending) thousands of dollars to tell the public that RED GUM is not only "America's most winsome wood," and *a thoroughly reliable wood* when properly manufactured, but also that to have a suite of "Genuine American RED GUM" in one's home is a *fact to boast of.*

As the public is being continuously educated to CALL FOR RED GUM BY NAME, isn't it good policy for all furniture manufacturers who make RED GUM furniture to call it by its RIGHT NAME and nothing else? Isn't it GOOD BUSINESS to do so? If they *don't, what will they say* when the public ASKS for "REAL RED GUM?" Are we right?

Write us for samples, particulars and general information.
Our reply will be prompt, personal and dependable.

GUM LUMBER MANUFACTURERS' ASS'N

1314 Bank of Commerce Building, Memphis, Tennessee

CRATING LUMBER

Spruce--

1 x 4", and 1 x 4" and wider in Mill Run and in Mill Cull grades.
5/8" x 4 and wider running about 90% to 4".

Hemlock-- 1" and 2" in Nos. 1 and 2 grades.

Before ordering, communicate with us.

READ BROS., LIMITED

43 Victoria Street - - Toronto, Canada

Gregertsen Brothers Company

Phone: Harrison 2967 **McCormick Bldg., CHICAGO, ILL.**

Cypress and Tupelo

Rough or Dressed Lumber for quick shipment. We carry a large stock of Cypress from 1" to 4" every grade, in our Cairo yard. Can execute orders in twenty-four hours from this stock, and guarantee quick delivery. Write us for prices.

YARDS AT CAIRO, ILL.

Wholesale Lumber

If you are on the look-out for good lumber—the kind which will meet your requirements—ask McLennan.

Complete stocks of Hardwoods—MAHOGANY, WALNUT and CHESTNUT, also VENEERS in all THICKNESSES—MERCHANTABLE and CRATING SPRUCE. CLEAR PINE for PATTERN MAKING. Also all Common Grades.

Then again, these Stocks are ready to ship to you now. We know what *Service* means in the business category—*Ship Now!*

The McLennan Lumber Co., Ltd.

MONTREAL - - - - - QUEBEC

& YET AGAIN

here's proof that we are not only PULLING FOR GOOD OLD

OAK

but also *for those WHO SELL IT*—

IS THIS YOU?

Month by month we are working on the CONSUMER (*Your Customer*) for a big, strong "COME-BACK" **of OAK!**

Watch us!

Does your line meet the issue? If not, it can by next season.

STILL ANOTHER OAK FURNITURE ADV. APPEARING IN THE BEST MAGAZINES IN AMERICA.

"The Return of the Prodigal Taste"—a true story in one adv. (*see below*)

"THE BASIS OF FURNITURE COMPARISONS"

The following conversation really happened once that we know of. Probably it is paralleled many times—the country over. (Perhaps by *you*.)

"Every time I look around our new home, dear, I am thankful to the architect for being so insistent about this OAK furniture. He said we'd have to do a lot of insisting to get really *good* furniture in this noble wood—and it certainly is worth all the insisting we did."

"Well, I told you we had an architect who was well-grounded in his taste and his knowledge. He ...

AMERICAN OAK MFRS' ASSN.,

LET US CONSULT TOGETHER FOR THE GOOD OF ALL CONCERNED. WRITE US. WE'LL ANSWER.

ROOM 1408, 14 MAIN STREET, MEMPHIS, TENNESSEE

Hardwoods

M B

Dealing exclusively in hardwoods, we have a stock that is equal to almost any demand. It includes the following:

American Walnut	Mahogany
French Walnut	Poplar
Red Cedar	White Ash
Lignum Vitae	Oak
Birch Flooring	Rosewood

White Oak Flooring

We want the business of the man who is particular. That's why we get so many repeat orders.

The Martin-Barriss Co.
Cleveland, Ohio

The Atlantic Lumber Co.

Manufacturers

Strictly Soft Textured

Quartered and Plain White Oak
Red Oak

Chestnut, Poplar, Cherry

Tennessee Scented Red Cedar

High Grades—Quick Shipments

110 Manning Chambers Phone Main 6386 **- TORONTO**

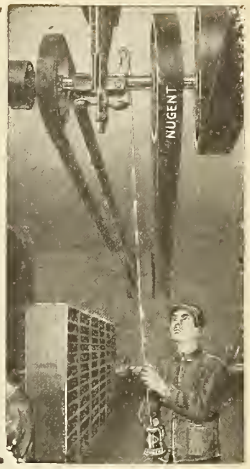
HEAD OFFICE, BOSTON MASS.

Mills: KNOXVILLE, TENN., WALLAND, TENN.
FRANKLIN, ARRINGDALE and BUTTERWORTH, VA.

NUGENT Shaft Oilers

No ladders, scaffolding, etc., are needed when these oilers are used. They induce REGULAR ATTENTION to overhead bearings. In terms of dollars and cents, not including accident costs, this means reduced friction, longer service for journals and bushings, fuller power transmission, coal saved. Can you reasonably afford to expose yourself to such accidents when the cost of this preventative is only $7.50?

When ordering, please state distance from floor to shaft. Price of tubing, 20c per foot extra.



WM. W. NUGENT & CO.

Manufacturers of Oiling and Lubricating Devices, Oil Filters, Oiling Systems and Telescope Oilers

143-150 W. Superior St., Chicago, Ill.

Churchill-Milton Lumber Co.

Sales Office: Louisville, Ky.

Mills—Greenwood, Miss.; Glendora, Miss.

Let us have your enquiries for—

Ash
Plain Oak
Quartered White Oak
Quartered Red Oak
Elm
Tupelo
Cottonwood

Plain Red
Quartered Red **G**

Sap **U**

Qtd. Red, Sap No Defect **M**

OUR SPECIALTY IS DELTA GUM

CORRUGATED FASTENERS

DIVERGENT SAW EDGE

Makes Work Easy and Strong, Tight Joints

ACME STEEL GOODS CO. OF CANADA, LIMITED
MONTREAL

Dermott Offers You, Mr. Buyer:

QUARTERED WHITE OAK

3 cars 1 in. firsts and seconds.
1 car 1¼ in. firsts and seconds.
2 cars 1½ in. firsts and seconds.
1 car 2 in. firsts and seconds.
5 cars 1 in. No. 1 common.
2 cars 1¼ in. No. 1 common
1 car 1½ in. No. 1 common.
1 car 2 in. No. 1 common.

PLAIN WHITE OAK

10 cars 1 in. firsts and seconds.
4 cars 1¼ in. firsts and seconds.
2 cars 1½ in. firsts and seconds.
2 cars 1¾ in. firsts and seconds.
5 cars 2 in. firsts and seconds.
½ car 2½ in. firsts and seconds.
½ car 3 in. firsts and seconds.
5 cars 1 in. No. 1 common.
2 cars 1¼ in. No. 1 common.
1 car 1½ in. No. 1 common.
3 cars 2 in. No. 1 common.

PLAIN RED OAK

4 cars 1 in. firsts and seconds.
1 car 1¼ in. firsts and seconds.
1 car 1½ in. firsts and seconds.
5 cars 1 in. No. 1 common.
1 car 1¼ in. No. 1 common.
1 car 1½ in. No. 1 common.

PLAIN RED GUM

5 cars 1 in. firsts and seconds.
2 cars 1¼ in. firsts and seconds.
1 car 1½ in. firsts and seconds.
5 cars 1 in. No. 1 common.
2 cars 1¼ in. No. 1 common.
2 cars 1½ in. No. 1 common.

SAP GUM

7 cars 1 in. firsts and seconds.
2 cars 1¼ in. firsts and seconds.
2 cars 1½ in. firsts and seconds.
1 car 2 in. firsts and seconds.
5 cars 1 in. No. 1 common.
1 car 1¼ No. 1 common.
1 car 1½ in. No. 1 common.
1 car 2 in. No. 1 common.

Will be pleased to name you prices on any items in Southern Hardwoods. If you require well-manufactured stock, containing good widths and lengths, we can serve you.

DERMOTT LAND & LUMBER COMPANY

General Offices 1559 Railway Exchange Bldg. CHICAGO, ILL.

Band Mill and Yards—DERMOTT, Ark.

We are Long on

Firsts and Seconds

MAHOGANY

OHIO QUARTERED WHITE OAK

No. 1 Common and Better

Charles F. Shiels & Co.

CINCINNATI, OHIO

Long-Knight Lumber Co.

Manufacturers and Wholesale Dealers

INDIANAPOLIS, IND., U.S.A.

HARDWOOD LUMBER

Walnut, Mahogany

and

American Walnut Veneers

SPECIAL:

5 cars 5 4 1 & 2 Pl. Red Oak

General View of Our Operations.

Piling Clear Walnut Dimension Stock for Seasoning.

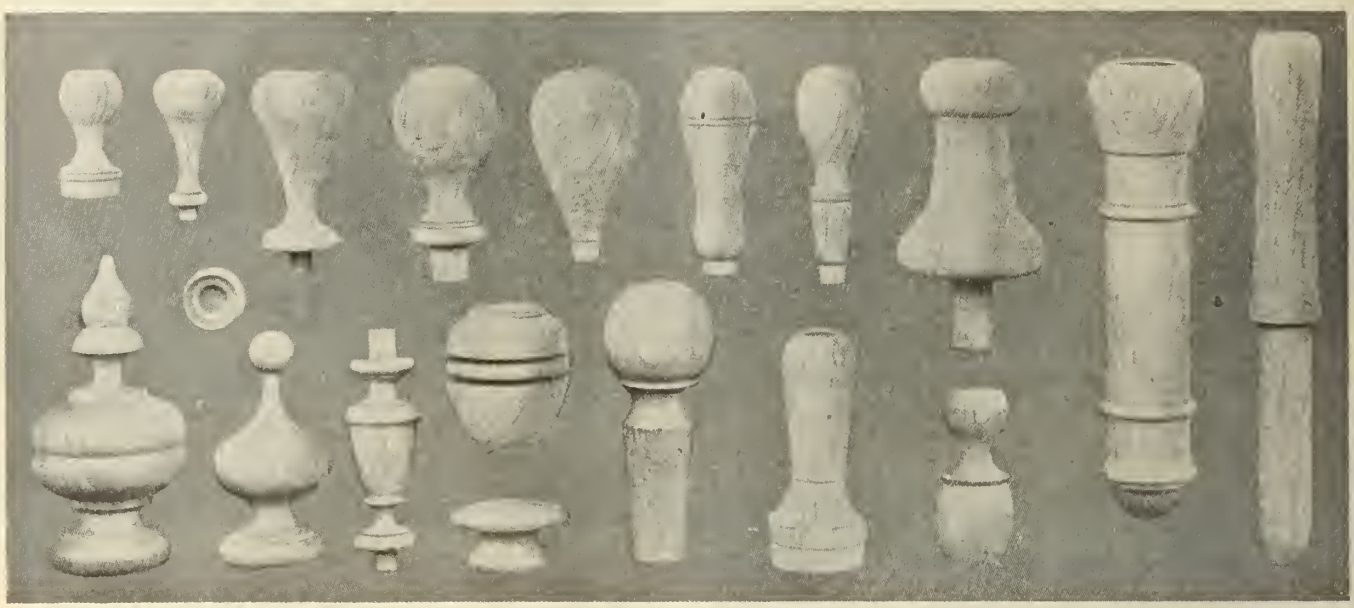
"Hartzell's Choice Walnut"

THIRTY-SIX years' successful experience in Walnut. Let us solve your Walnut problems. Dry Walnut, all thicknesses and grades. Plain and ribbon figured table tops, chair stock, squares. Long figured Veneers and Buttwood.

Our prices will interest you.

Geo. W. Hartzell
Piqua, Ohio

Our Main Office at Piqua.



Dowels and Wood Turnings

Those Smooth Dowels

The new dowel machine is a wonder for efficiency. The new process dowel made from it is round. Always round. There is nothing about the manufacturing process which could produce anything but a round dowel.

It is also always uniform in diameter and never varies more than a few thousandths of an inch from the measurements desired. The dowel is finished and polished with a clean cut lengthwise of the grain and not with a scraping cut crosswise of the grain, as in the old method.

These machines are adjustable to any size from 3/16 of an inch to one inch, making these changes as fine as to a 64th of an inch. Our smooth dowels are straight, round and perfect.

Special Shapes

We show above a few of the many shapes which we can turn out with our special automatic machinery.

We are in the centre of the hardwood district and can turn out any shape wanted, in any quantity, perfect and smooth, at short notice. Write us about anything which you may need that can be turned out of wood.

Dowels the Smooth Kind

Birch, Beech and Maple
Plain, per 1000 Pieces

Length	3-16 in.	1-4 in.	3-8 in.	1-2 in.	5 8 in.
12	$1.50	$1.50	$1.80	$2.20	$2.95
16	1.95	1.95	2.40	2.95	3.93
18	2.20	2.20	2.67	3.35	4.40
24	2.95	2.95	3.60	4.40	5.90
27	3.35	3.35	4.05	5.00	6.60
30	4.05	4.05	5.00	6.16	8.20
33	4.50	4.50	5.50	6.75	9.00
36	4.95	4.95	6.00	7.33	9.80
42	5.70	5.70	7.00	8.60	11.50
48	6.50	6.50	8.00	9.80	13.05
54	9.20	9.20	11.20	13.80	18.40
60	11.25	11.25	13.75	16.85	22.50
66	13.05	13.05	16.00	19.55	26.05
72	14.75	14.75	18.00	22.05	29.40
No. DOWELS TO BUNDLE	1000	500	200	200	100

Besides the above sizes, we make dowels up to 1 in. or any fraction thereof. In addition to the smooth kind we make the glue joint dowel in all sizes.

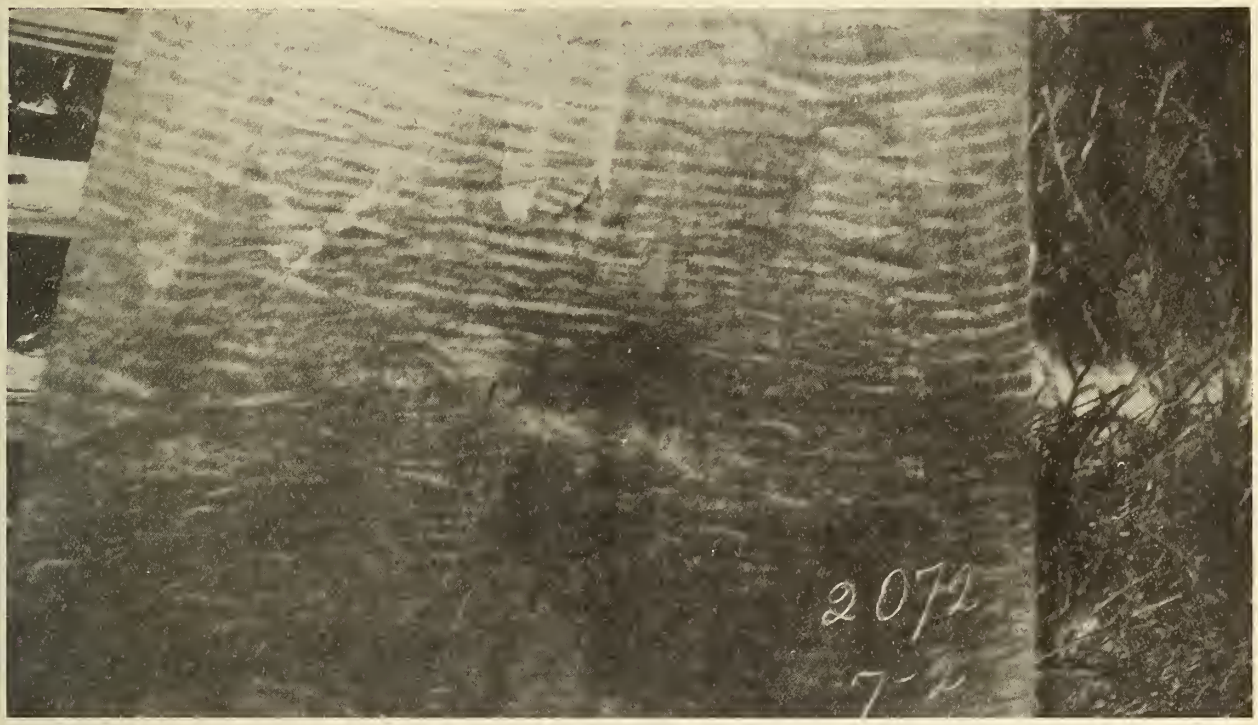
Tell us your wants and get our prices.

Toy Products of Canada, Limited
FARM POINT, P.Q., CANADA
Makers of Wood Products and Toys

American Walnut Veneer

A Sample which shows the class of Veneer we handle.

Our efforts are centered in obtaining the highest grade of
FIGURED WALNUT FOR VENEER CUTTING



Our customers' often repeated orders prevent us from keeping a large stock on hand, but as we are continually selecting our stock from the large quantity of logs we handle, we always have a nice line of the highest grade to select from.

Our reputation is based on "Quality, not Quantity" in our Veneer business

PICKREL WALNUT CO.

ST. LOUIS, MO.

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Edward Clark & Sons

Toronto

CANADIAN HARDWOODS—winter cut **Birch, Basswood, Maple**

Ontario and Quebec Stocks, East or West, rail or water shipment direct from mill to factory.

We have a few choice cars of

4/4, 6/4 and 8/4 Birch

High grade 1sts and 2nds and No. 1 Common, running well to long lengths.

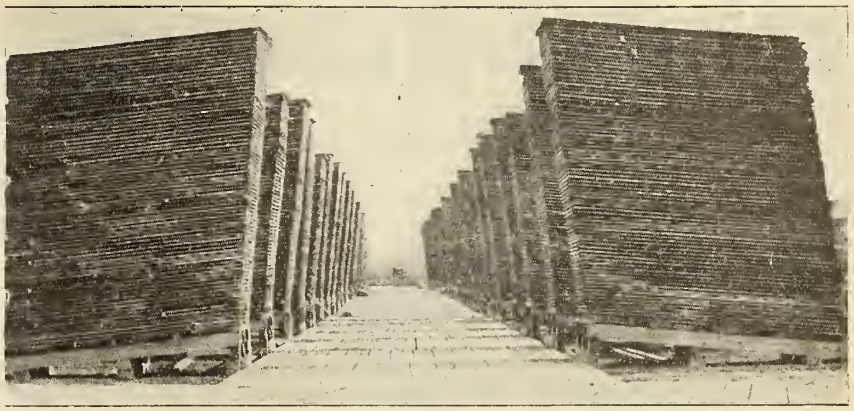
Let us quote you on

1", 2" and 3" Quebec Merchantable Spruce

We Commend to Your Notice:

Our lumber is reliable, our grades uniform, our shipments prompt, and receive personal supervision; our prices consistent. We have had long experience. We desire to serve.

Two Conclusive Proofs Why You Should Buy Your Lumber From Us



Examine closely the picture above, then read the following letter we received a few days ago from one of the largest manufacturers of Mouldings in the world. (Lumber for Mouldings must be absolutely flat and straight.)

"We have been using exclusively gum lumber, both sap and red, shipped by you for the last three years, and have been well pleased with its character, both as to grade and condition. The condition of same being an evidence of careful handling before shipping. We have been well pleased with the transactions which we have had with you, and will endeavor to continue using your stock as long as available."

We also manufacture Oak, Ash, Elm, and Cypress at Louise, Miss., mills. Get our prices before placing your orders and become a SATISFIED user of Gum or one of the other Southern hardwoods.

BARR-HOLADAY LUMBER CO.

GREENFIELD - OHIO

Kentucky White Oak

(Soft Texture)

We are in an excellent position to handle your orders quickly and to your entire satisfaction.

Walnut
Mexican Mahogany
Quartered White Oak
Ash, Cherry, etc.

Write for prices or send us your requirements.

Canadian Representative:
A. E. KLIPPERT
11 Laxton Ave., TORONTO
Phone Parkdale 1354

LELAND G. BANNING

CINCINNATI, OHIO

Felger Lumber & Timber Company

Manufacturers and Wholesalers

Cuban Mahogany

We carry a complete stock of Cuban Mahogany in Grand Rapids as well as at our mill in Havana, and can make prompt shipments.

Southern Hardwoods

We Specialize in

Gum, Oak, Chestnut and Poplar.

Grand Rapids, Michigan

Suite 733 Michigan Trust Bldg.

Red Gum

Quartered or Plain Sawn

Thick or Thin

This Has Been Our Specialty for Twenty Years

Red and White Oak

Quartered or Plain

All Thicknesses

Mills:

Percy, Greenwood and Ruleville, Mississippi

Head Offices—CINCINNATI, OHIO

The

Korn-Conkling Co.

BLACK WALNUT

Large Stock 1 to 3 inches thick ready for immediate shipment

also

Well Assorted Stocks of

West Virginia & Kentucky

O A K

Ash, Maple, Hickory, Chestnut, Basswood and Poplar

Prices and stock list on request

Burns & Knapp Lumber Company

CONNEAUTVILLE, PA.

Kentucky Lumber Company

LEXINGTON, Ky., U. S. A.

Manufacturers

WHITE and RED OAK
RED and SAP GUM
POPLAR - CHESTNUT

and all Southern Hardwoods

We Manufacture and Sell Direct

Mills at

Burnside, Ky. Williamsburg, Ky.

Sulligent, Ala.

FOR SALE

DRY BIRCH and SPRUCE

Well Manufactured Stocks.
Prompt Shipments.

E. M. NICHOLSON & CO.
202 Board of Trade B'dg., MONTREAL

Dry Spruce and Birch

Good Stocks, Prompt Shipments, Satisfaction

C. A. SPENCER, Limited

Wholesale Dealers in Rough and Dressed Lumber

Offices –500 McGill Building
MONTREAL - - Quebec

"Gum of Quality"

Yazoo River Red Gum

as produced by

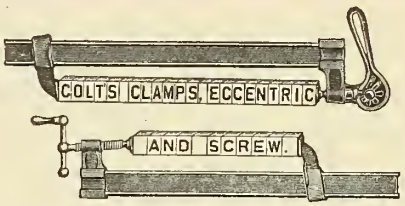
Thomas & Proetz Lumber Company

3400 No. Hall St. St. Louis, Mo.

is carefully manufactured; soft in texture; dark, rich in color; and admirably suited for furniture and interior trim.

Mills—Belzoni, Miss.; Catchings, Miss.; Naples, La.

If you are not buying from us, write today.



COLT'S QUICK ACTING CLAMPS

During the 36 years these clamps have been on the market we have developed many styles for the special use of the Furniture Manufacturer.

TIME SAVERS

Ask for Catalog No. 276

BATAVIA CLAMP CO.
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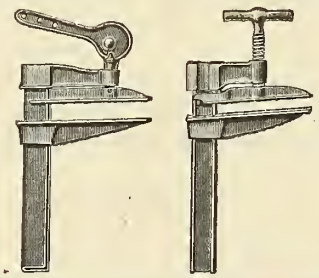

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Conditions in the Furniture Industry

The furniture industry in Canada is in a healthy condition. Factories in all parts of the country are turning out a steady volume of work. Retailers report that they are not anticipating any falling off in buying. In fact, as the Christmas season approaches they are making preparations to handle increased business. They are keeping up their advertising and showing attractive window displays and keeping up the people's interest generally in furniture.

That the finances of the country are in a healthy condition is indicated by the following financial statement, issued by the Minister of Finance: "Receipts from all sources show an increase of $24,000,000 over the corresponding period of last year. Payments on capital and ordinary accounts, including the increased interest and pension charges, are $1,800,000 less than for the first six months of last year. The net result, apart from war expenditures, shows an improvement in the financial position of $25,000,000, as against the first half of the year 1916-17. During the six months in question the surplus revenue over capital and ordinary expenditure amounted to $65,000,000, which was applied in payment of the principal of war expenditure in Canada."

The outstanding features of the manufacturing end of the business has been the shortage of help and the necessity of introducing all the labor-saving devices possible. Several of the manufacturers have told the writer recently that conscription will have little or no effect on them, as all their eligible young men have enlisted voluntarily. Female labor has been introduced in a great many factories, with considerable success. The opinions of a number of manufacturers regarding female labor are published elsewhere in this issue.

The turning to labor-saving devices during the past couple of years has been very marked. Particularly is this noticeable in the finishing rooms. Manufacturers have always been more or less on the lookout for improvements in woodworking machinery, but in the finishing room it took the shortage of labor caused by the war to make them realize fully the necessity of adopting machine equipment. With these labor-saving devices and the assistance of women on the lighter operations, manufacturers have been able to get along fairly well.

Some of the larger plants are not operating to their full capacity, but they are turning out a steady volume not much below the capacity. The activities are not confined to any particular grade of furniture. The largest sales are probably of the medium grades, consisting of modified reproductions of period styles. There is also a large quantity of the very cheap lines, such as imitation oak and mahogany, being sold. Some of the furniture manufacturers are going into the manufacture of talking machines as a side line. At least three large firms have recently announced that they are putting out lines of these machines.

In placing this, our annual Furniture Production Number, before our readers, we feel that the practical articles and suggestions are well worthy of their attention. The articles have all been prepared by men well conversant with practical conditions, and no doubt you will find some ideas that you can apply to your own problems. The advertising pages also are specially interesting. The firms represented therein are recognized as leaders in their respective fields. They are progressive in bringing out new ideas and new lines. A perusal of what they are now offering may be of value to you.

Period Designs and Modern Adaptations

What Present Day Manufacturers Have to Contend with—Must Produce Furniture of Beauty and Utility Under Keenly Competitive Conditions

By F. K.

Fig. 1—Authentic Chippendale chair.

TO-DAY a man exists upon his ability and usefulness. A furniture manufacturer's line exists upon its merit in design, finish, construction, price for value offered.

Our life is intensely practical; the cry everywhere is for utility. Therefore, modern designers and manufacturers have to meet that demand and produce furniture that is pleasing to the eye. It must also have style, usefulness, and be sold at a price.

At the present time almost every furniture manufacturer has the passion to reproduce modern adaptations of period pieces. You will notice in a great many of our factory offices books with titles such as "Talks on Old Furniture," "How to Know Period Styles," "Seventeenth Century Furniture," etc., written by our modern designers. With the revival of these styles a consequent higher standard of workmanship is required in the factory. The furniture artisan of the future will be more skilled, better educated, and capable of more constructive work than his predecessor.

Furniture-making is no doubt one of the oldest of applied arts, dating practically from the beginning of civilization. At the present time there are many pieces of furniture designed by the great masters of previous centuries which are still in excellent preservation, and serve as perfect models for our modern designers. Our manufacturers have certainly lost no time in adapting themselves in turning out reproductions of the above models—of course, consistent with our commercial life and practicability.

There are a great many people who "turn up their noses" at the period product of our modern factories and are frequently heard comparing the work of the "good old days" with that of the modern manufacturers. The usual plan of these so-called critics is to take some of the old masterpieces of long ago—pieces on which neither expense, time, or labor was spared—and place them side by side with the commercial product of the present-day factory, designed and made under modern conditions and sold for a totally inadequate rate of remuneration.

Having compared the old masterpiece and modern production, the critics sagely wag their heads and enquire: "Where is your modern designer and manufacturer now?" I think you will agree with me that the modern designer and manufacturer comes out of the comparison very brilliantly indeed. If the designers of the previous centuries were placed in the position of the modern designer—compelled to "cut prices," sell big quantities, and hold their own against the keenest competition on every hand and yet at the same time produce good furniture, combining beauty and utility, and also at a price—what would be the result

To produce furniture economically, large quantities have to be manufactured; but, owing to the constant changing of styles, this cannot be done as in former years. At the present time styles of furniture ebb and flow in popularity. You will notice that a certain period sells well in one season and is in less demand the following. This is not because one style is less worthy than the other; it is due to that very human trait, the love of change—something new.

The day is past when a manufacturer could keep his plant going on a few designs, which he had been selling for years. The cry of the manufacturer now is that he carries too large a line of designs, and they must admit that it is essential. Furniture salesmen on the road will say that large lines are necessary. And

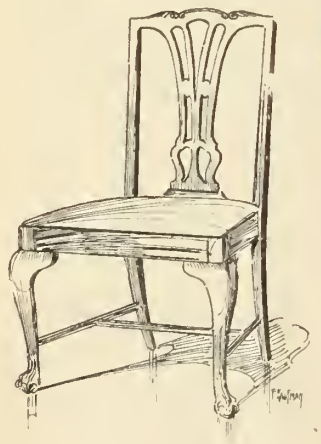


Fig. 2—Modern Chippendale chair.

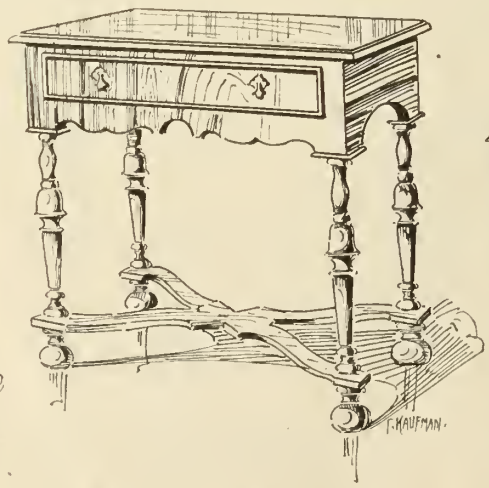


Fig. 3—Original William and Mary piece.

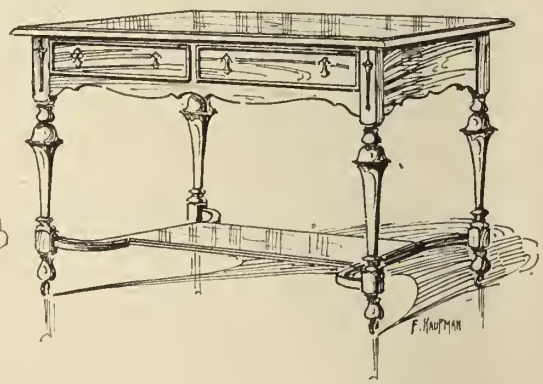


Fig. 4—Factory production of William and Mary table.

we all know the dealer expects to see new lines every time the salesman calls upon him.

The styles now seem to follow a cycle of public favor, each enjoying its turn, so far as popular taste is concerned. Therefore, economic production demands that as many parts as possible be made to standard

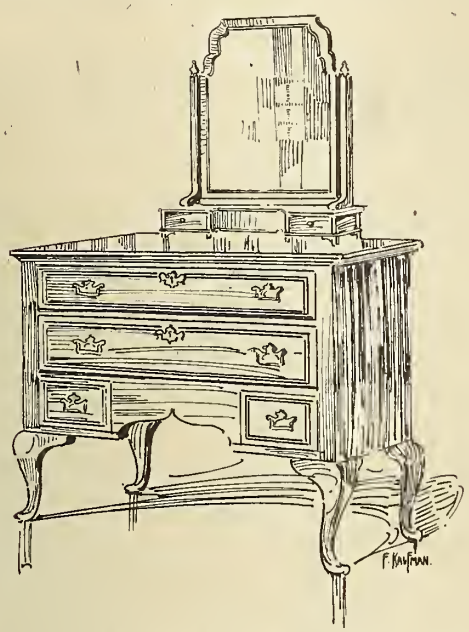


Fig. 5—Queen Anne chest of drawers.

sizes and interchangeable, such as tops, gables, frame rails, dust boards, back and front legs of chairs, side rails, runners, etc., and many other parts. In fact, the interchangeable idea can be carried out in other lines. This would enable the manufacturers to get the above

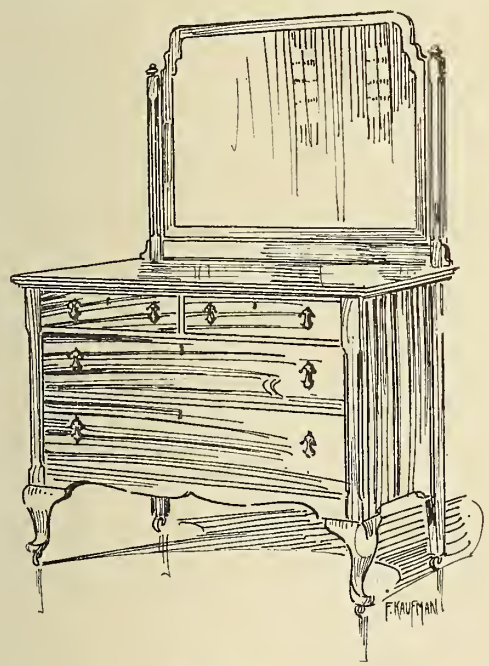


Fig. 6—Modern Queen Anne dresser.

pieces out in quantities. Under these conditions the designer should be made to stick to standard sizes.

The sketches of the pieces shown are taken from photos of the original pieces, in various museums and collections. These illustrate the pieces designed by the old masters, adapted for present-day selling.

Fig. 1 is an authentic Chippendale chair, in mahogany, date about 1755. The measurements are: Floor to top of back, 38½ inches; width across front of seat, 21¾ inches; outside depth of seat, 18¾ inches.

Fig. 2 is a modern adaptation of the same chair.

Fig. 3 is a William and Mary table, in walnut. This table is in possession of Messrs. Gill & Riegate, London, Eng., and was made about 1695. The dimensions are: Width, 29 inches; height, 28½ inches; depth, 16 inches.

Fig. 4 is a modern creation of the William and Mary style.

Fig. 5 is a Queen Anne chest of drawers, in walnut, in the possession of the Victoria and Albert Museum, London, Eng. It was made about 1705. The drawers are inlaid with black lines. The measurements of the chest, without the mirror, are: Width, 30 inches; height, 31 inches; depth, 19¾ inches.

Fig. 6 is a modern rendering of a Queen Anne dresser.

Wooden Tea Trays Wanted

The Canadian trade commissioner at London, Eng., in a recent report, says:

In the course of an enquiry instituted upon behalf of a Canadian manufacturer it has been ascertained that very large quantities of tea trays, mainly oak, almost exclusively of German manufacture, were imported into this country previous to the war; and, as dealers report that the efforts of British manufacturers to replace this source of supply have so far not been satisfactory, there should be a good future opening for the Canadian article, provided that patterns can be furnished which are in established demand here and that the trays can be laid down at competitive prices The demand is principally for a plain and inexpensive type, and the sale of inlaid and more costly trays is comparatively small.

The first of these conditions, however, necessitates a considerable departure from many of the types of trays which are manufactured for Canadian use, and in the case of some of the trays which are the best sellers in Great Britain, the production of special designs.

It is also certain that Canadian prices are much too dear, present quotations being considerably in excess of current values, and about double the price at which German trays were delivered in this country before the war.

As, however, large quantities of these tea trays are sold in this country and leading dealers would be prepared, if satisfactory arrangements can be made, to contract for large and regular supplies, the possibilities of the trade deserve the attention of Canadian manufacturers. It should be an easy matter to adopt such alterations as are necessary, while production upon a large scale would permit of a considerable reduction in cost, and enable Canadian manufacturers to fall more into line with the views of buyers in this country.

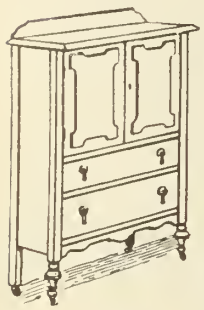
In London alone some of the principal firms dealing in these tea trays express their willingness to go into the matter thoroughly with Canadian manufacturers who are adequately equipped for handling the business.

For the time being the importation of tea trays, like other manufactures of wood, into the United Kingdom is entirely prohibited, but it is a favorable time for investigating prospects for the future.

Kiln-Drying Lumber for Furniture Work

Open and Close Grained Woods Require Different Treatment—Centre Flue Recommended when Loading Kiln Cars—Use of Live Steam for Spraying Not Favored

By A. S.



THE kiln drying of lumber is among the many important questions that arise from time to time in the manufacturing of furniture. Any practical furniture manufacturer will agree that lumber, if too dry, presents just as many problems as if it is not dry enough. There are a number of different kinds of lumber being used in the manufacture of furniture, and each kind requires entirely different treatment.

When the manufacturer receives his lumber from the lumber company it is in a condition which is known as shipping dry. In this condition lumber weighs from 3,200 to 4,500 lbs. per thousand feet. The first question the dry kiln operator has to decide is whether the stock is in fit condition for the dry kiln. This depends largely on what kind of lumber it is. Woods with an open grain, such as basswood, elm, ash, chestnut and soft maple would not be seriously damaged by being put in the kiln while in this condition; that is, provided the stock was properly put on sticks before entering the dry kiln. It would also be necessary to keep the various lengths together and leave plenty of air space between each piece.

Do not use too high a temperature, but dry slowly, keeping the temperature for the first forty-eight hours at 110 degrees and the humidity at 75 degrees. Then gradually reduce the humidity and raise the heat to 125 degrees for the next 24 hours. After that reduce the humidity to 20 to 25 degrees and raise the heat to 160 degrees. This will dry any open-grained wood in from 8 to 10 days, but I would recommend that all kinds of lumber be properly piled outside to air dry before entering the dry kiln.

Supposing a manufacturer runs out of a certain kind of stock, such as plain or quarter sawed oak, gumwood, walnut, sycamore, or beech, he will order some of this material to be shipped immediately, and when it arrives he will naturally be anxious to get it into the dry kiln. The man in charge of the dry kiln will likely receive orders to have it properly kiln dried as soon as possible, as the stock is required in the cut-out room. Taking the lumber in the green, heavy handling condition in which it has been received, the first thing the man in charge should do is to take one of the pieces of lumber and test it by cutting a piece out of the centre of a board. The piece should be from 1 inch to 1½ inches wide and the full width of the board. The width of this piece should be measured accurately and the piece placed on some hot pipes or in a hot oven that will give from 190 to 200 degrees of heat and left there for at least three hours. This process takes away all moisture and causes the piece to become bone dry.

The piece should then be measured, and if it shows ½ inch or even ⅜ inch shrinkage this shows plainly that the stock is very green and full of nature. In that case your kiln must be adjusted and run according to the condition of the stock. I think all furniture men will agree that the best results are got from any kind of dry kiln by properly regulating the humidity, the heat and the air circulation. Steaming is recommended for all hardwood lumber that is six to ten months old.

Most men in charge of dry kilns try to squeeze in every board they possibly can, crowding the trucks up close together. This is a serious mistake. There should be not less than one foot of space between each truck load. When trucks are up close together the air circulation is checked and without proper circulation you cannot dry lumber properly. When I put green lumber in the kiln, I pay particular attention to how it is loaded, using plenty of sticks and placing them 1 inch from each end and on an average of 2 feet apart, according to the length of the stock.

I place eight boards to the row, that is, four pieces on each side with a 2-inch air space between each piece and a 4-inch flue in the centre of the load. As each row is laid draw your centre flue in a quarter of an inch, and so on, until you get within one foot of the height your kiln will take. Then close your flue space by laying on a wide board of the same stock you are loading. The load can then be piled to the full height, keeping each piece 2 inches apart.

The centre flue draws the humidity and heat up through the centre of the load and the wide board over the flue checks the circulation and causes the heat to circulate through the load. Before putting the load in the kiln I always take a reading of the kiln and steam chamber, as all green lumber should be steamed before it is put into dry heat. I find that I get the best results by taking a reading as soon as work starts in the morning. If the temperature is not over 140 degrees and the humidity not less than 90 per cent. run your stock in. This gives you the benefit of the exhaust steam for ten hours, and exhaust steam has been proven to be the best for steaming lumber.

Stock should be steamed for 48 hours. The humidity should be from 90 to 100 per cent. and the heat should be 140 degrees or over. Never use live steam to spray lumber, as it will make your steam chamber too hot; and by raising the heat in this manner the lumber will honeycomb, cup up, and shrink away in the centre of the piece. When the plant closes down in the evening and your exhaust steam is over for the day, close the spray line nearly off, leaving it open just enough to allow sufficient steam through to carry off any condensation that might gather in the pipes.

After the lumber has been sprayed for 48 hours the pores open and allow the moisture to escape from the centre of the piece without doing any damage to the lumber. When the pores have been opened in this manner the stock should be run into a higher temperature and the humidity lowered to 75 per cent. Leave in this heat for 36 hours; (after lumber has been in the kiln for 84 hours there is no danger of honeycombing or checking). Then lower humidity

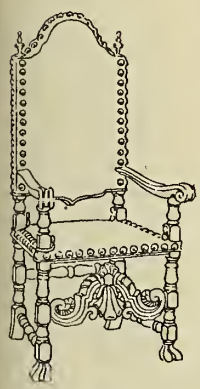
to 35 per cent. and raise heat to 175 degrees. Leave in this heat until dry. The lumber should then be run out into the store-room and left in the same position in which it was taken from the kiln for at least 24 hours. This gives plenty of time for the lumber to cool and the grain of the wood to set.

Some manufacturers take their lumber direct from the kiln to the cutting-out room, run it through a rough planer and pile it down to sweat with the windows thrown wide open and the dampness coming in. The hot lumber, of course, absorbs all this. Lumber is then cut and ripped to length and width when in this condition. This is one reason why so many manufacturers have trouble with loose joints.

Checking Up the Job in the Machine Room

Author Outlines System of Checking Material by Which Job Reaches Cabinet Room Complete —No Holding It Up Waiting for Missing Parts

By S. E. Saunders



MAKING and keeping a machine room 100 per cent. efficient is, to the mind of the writer, something that has still to be attained. And is this not the very subject that many a manager worries over, particularly if he himself is not a practical man, but has to depend almost entirely on his subordinates.

If you want your machine room, and other departments as well, to pay, you must have system, some easy and workable way to keep tab on your product, whether it be washboards or the highest grade bedroom furniture. You have a right to know, and should know at least once a week, where certain jobs are in your factory, and if they are not coming through as per schedule you should know the reason why, or be in a position to find out.

Let those readers with the necessary ambition to make their machine rooms pay, and those of us who are foremen or superintendents, picture a plant where the conditions are as follows: From the swing saw to the sander or shaper, or wherever the last operation is performed, the man takes hold of whatever job suits him best, in most cases the easiest. If the drawer sides or front rails are lost nobody knows anything about them, and in some cases nobody cares. Quite often the swing saw man is obliged to cut the lost parts out again, and so on. Is it not an old story? It certainly is.

How are we to best overcome this? To make a machine room pay, to make it at least 85 per cent. efficient, we must start at the office. Why from the office? Because the office knows the lines that are selling and therefore will know when certain jobs should be cut, machined, benched, finished and ready for shipping. It is therefore necessary and essential, that weeks before cutting, the yard foreman should have estimates of quantities and varieties of lumber required for a certain period. This will give him time to supply the dry lumber.

Many plants have large dry-lumber sheds with an assortment of stock always ready for cutting. The swing saw men have the list of jobs required to be cut out for the week, these lists being issued from the office. The jobs are completed in order as the dry lumber is ready for them. The writer has in mind a certain well-balanced establishment which actually dates its shipping days from the time the jobs are billed to be cut. These jobs pass along over the floor from machines to benches, and when they arrive at the bench room they are complete.

How is this accomplished? As the first operation after the stock leaves the saws is the facing and gluing preparatory for the sticker and planer, the subforeman, or gang boss as he is sometimes termed, checks every item of the stock bill, and the job is not allowed to pass on to the sizing machines unless it is complete. The next men to check up are the sticker men and planer hands. The job is here again checked in detail and counted and examined. Anything that may have accidentally passed the rippers or jointer men is here made right, the full number, and no more. System!

Now all these pieces have to be cut off, tenoned, etc., and again the bill is referred to, and the job checked up. The various other operations are carried out and then the last checking takes place at the elevator just before the parts enter the cabinet room. Readers will readily understand the amount of unnecessary running around saved by this system. How much easier to find this piece or that one when some simple and inexpensive system such as I have explained is in force.

Three sets of stock bills should be used, each in exact duplicate; one for roughing out men, one for machine men, and the other for the elevator. Bills for each department must remain in some handy place when job is in process, so that they can be easily referred to by the men, then returned to a general cupboard till they are wanted on next batch.

The machine men have their schedule of jobs laid out in the office for the week, and it is always understood by the sub-bosses that these jobs, as listed, must follow in rotation. Of course, this last rule is somewhat elastic. Often the veneering, turning, carving, etc., will hold a job, and it cannot be helped. On the other hand, the office is, or should be, advised regularly by a weekly report of the jobs cut, machined, benched, etc. Thus the sales manager can advise his customers intelligently when they may expect their shipments.

In closing let me say that to my mind the manager who can get his foremen and men to work alongside of him and not for him is the winner. Co-operation is what counts between employer and employee. Keep every workman intent on his job. Have each foreman interested in pushing his end of the production and all the department heads working in a common cause without rivalry. Do this and you insure ideal conditions for the economic use of time and materials. This is what makes the factory, large or small, a leader in production.

Breaking Out Mahogany, Walnut and Oak

Head Swing Saw Operator Outlines His System of Cutting Out Stock and Makes Suggestions Regarding Lumber Grades That Work to Good Advantage

By F. J. Harris

BEFORE commencing a discussion on the breaking out of mahogany, walnut and quartered oak, it might be advisable to take up one or two points that make for efficiency in the breaking out department. One of these is the placing of the pile or car that the stock cutter is working from. This should be placed as conveniently as possible to the swing saw so that the operator does not have to waste his time walking after boards. The writer has seen factories where the operator of the swing saw had to walk 12 or 14 feet after every board.

After the location of the car or pile has been decided on, some attention should be given to the rollers on the swing saw table. Rollers should be used that will respond to a light pull on the boards being handled. In other words, have rollers that will roll. It takes about three times the energy to pull a board over a dead slat, or a roller that sticks, than it does over good running rollers.

If possible the lumber should feed into the swing saw from the right. The writer has used saws that have fed both ways and has always found the right-hand feed the handiest and quickest. Another essential in the breaking out department is plenty of trucks. If for some reason no trucks are available and the stock cut has to be piled on the floor, it means loss of time in re-handling it in getting it to the rip saws.

Before cutting up quartered oak, walnut or mahogany for furniture the stock should be run through the planer. If it is a double cylinder planer, with both cylinders running, all the better. A light cut should be taken off the best figured side of quartered oak, and walnut should be skimmed on the side that has the least sap. With mahogany there is not much difference which side of the board is planed. The main object in planing mahogany before cutting it is to be better able to see small worm holes, cross checks, dark spots and streaks. It is also a great help to the rip saw man when matching up joints and in arranging the pieces so as to get an even color and a good figured effect.

Those who have handled much mahogany lumber know that very often boards are found having wormy edges, while the centre of the board will be clear of all defects. If the wormy edges are ripped off in board lengths to a width suitable for front case rails, the stock can all be used up to advantage. The inside edges should be free enough from worm holes for case rails. By using this stock for case rails they work out as cheap, if not cheaper than by ripping up some cheaper wood, as the wormy portions of the mahogany could not be used for surface work in any case without veneering.

Another plan I have found to work out to good advantage when beginning to cut out a job in mahogany or walnut is to cut the thick stock first. By doing this, all or nearly all of the thin rippings and short ends can be used up on the same job. The longer rippings can be used for making beads, rail strips, glass frame rails and stiles, etc. The short ends that are at all workable on the machine can be split for leg glue blocks and numerous other small pieces where inch lumber of more serviceable lengths would have to be used. By using up the rippings and short ends in this manner an accumulation of odds and ends of stock that is difficult to work up is avoided.

The walnut stock in 1½ inch and 1¼ inch thicknesses should also be run through a planer before cutting, especially in the common grades, as by doing this those working it are enabled to see the defects, such as pith holes and tracts and small crumbling knots. The advantage would not be so noticeable in quartered oak, owing to its peculiar veining, which gives the figure, but the rippings can be used up in plain cut oak work.

In cutting out walnut for extension table tops and case tops, the main thing is to get an even color for matching up the joints. Right here the question comes up about ripping off the bright sap which we so often find on one and sometimes on both edges of walnut boards. Apart from the sap edges the boards may be of good quality stock and the question has not been settled by some manufacturers as to whether it is cheapest to rip off the sap edges or to pay the cost of shading on large surfaces. I think the best effect is got by cutting out the sap, but for narrower pieces, such as the making of frames and so forth, the sap portion can be worked in without causing much trouble.

I have found that the best grade of walnut for general purposes is that known as "common and selects." In cutting this kind of stock I have never had any trouble in getting all the large tops that we needed, and as there is usually (or there should be) a variety of work got out at the same time, there will be no trouble to use up all the short lengths. Then there will be no "left overs" lying in a heap on the floor or on trucks taking up space that should be used to better advantage.

Mahogany can be handled pretty much the same as walnut, with the exception of the sap, this being rare in mahogany. I have found it only a few times in Cuban mahogany. Extension table tops in quartered oak take all the best figured stock, and as I have cut the stock for several thousands at different times and tried various methods of getting them out, I have settled down to a style of work that seems to give the best results in getting the most out of the material when cutting out work from a No. 1 common grade of oak, with no very long lengths. I make it a practice to cut the best pieces of well figured board into two or three standard lengths, say 45, 49 and 55 inches long. By carefully selecting the stock it soon grows into proportions of hundreds of feet of good stock, and thus when an order is listed for extension tables I have this stock to fall back on for "filling out." An explanation of what is meant by "filling out" may be in order.

Most tables are cut from stock graded as "firsts and seconds." In order to save the time of the rip

sawyers who are matching the tops, and to get the best figured effect possible, I always try to cut three lengths from a board (I am speaking of round tables only now). In a 48-inch top we cut two pieces 48 inches long and one piece about 43 inches, from a 12-foot board. Unless the board from which these three pieces are cut is 8 inches in width we still need a short piece about 33 inches long to complete the top. That is what we call "filling out." This is taken from the reserve stock selected from No. 1 common, as before mentioned.

I find that 12-foot boards cut up best into 48-inch tops and 10-foot boards into 44-inch tops, where the filling out would have to be all long lengths, because a 10-foot board should be cut into three pieces of 45 inches, 41 inches and 32 inches. Fifty two-inch tops cut from a 12-foot board work best when cut off 53 inches, 49 inches and 38 inches and filled out when possible from the reserve stock or from stock cut especially for that purpose.

Sixty per cent. of extension table leaves are got from the common grades selected for that purpose when cutting out other varieties of work. Extension tables, being low down and having a large surface, it is very important to have the stock well matched in both figure and color. Some manufacturers insist on having the grain of the wood all laid the same way, claiming that it gives a better and cleaner face and costs less to polish; also, that it takes on a more even color when finishing. The best effect in quartered oak, when the finish is golden, is got when the grain of the wood is laid in opposite directions. But for certain other kinds of finish the grain should be all one way in oak, and especially so in mahogany and walnut.

I might also add that all case tops up to 54 inches in length are cut from a No. 1 common quartered oak and that without much difficulty when the "standard lengths" that I spoke of are kept up and we have some reserve stock to fall back on.

All drawer fronts in quartered oak up to 7 inches in width should be without a joint, as they give a better figured effect and save labor and material. Very often we find quartered oak boards 7 inches or 8 inches in width where the figure runs out about half way across the board. This kind of stock should be ripped in board lengths to suitable widths before being cut. The figured portion can then be used for 4-inch drawer fronts, rails, and stiles for glass frames, etc., while the plain figured part can be worked up for case gables, china cabinet backing and such like work, where a figured effect is not so desirable.

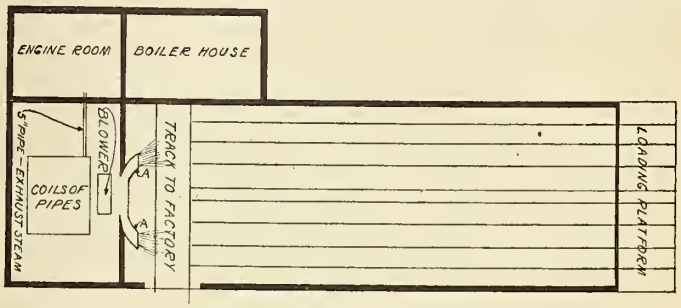
There being three or more grades of figure in quartered oak lumber, the man who handles the stock should have a good memory so that when he takes hold of a board he can see at a glance where it is best suited for. Along with the stock bill from which he is working there should be a good sketch or blue print of the piece of furniture the stock is being cut for, so that he can have a thorough knowledge as to which parts are most likely to be subject to the critical view of the purchaser.

Another good plan when cutting out stock is to select some of the very best stock that is of good width, good figure and as near the same texture as possible. This should be laid aside to be used for special orders. It will be found a great convenience and will save time which would otherwise be spent hunting around for suitable stock.

An Old Dry-Kiln Remodelled

How an old dry kiln was remodelled at a minimum of expense so that it now dries lumber satisfactorily is shown by the plan presented herewith. This kiln is in an Ontario furniture factory, and the writer will vouch for the heat that is blown through the pipes AA, because he stood in front of one of them. The kiln is 120 feet long and 32 feet wide, and the heat reaches effectively to all parts of it.

The superintendent who thought out the changes in the kiln stated that no scientific method had been



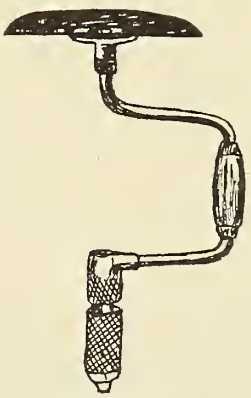
Heat is discharged through blowers.

followed for determining the number of coils of pipes or the size of the blower. Exhaust steam is used entirely to heat the coils, this exhaust being supplied by a 5 in. pipe.

Brace for Horizontal Work

The brace with the large head shown in the illustration was seen in use in a piano factory. It is used with a screw-driver bit for driving screws when the piano case is on its back on a pair of trestles, and the screws have to be driven horizontally.

The mechanic who was using the brace said that he had spent six weeks in the hospital some time previously, having ruptured himself by the constant pres-



Brace with large diamete head.

sure of the head of the brace against the pit of his stomach. When he returned to work he bought an extra brace and had the turner turn him out a head about six inches in diameter. He claims that with this brace the work is a great deal easier on him, as the pressure is distributed over a greater area of his anatomy.

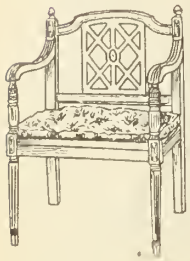
J. M. Pritchard Recruiting Forest Regiment

Mr. J. M. Pritchard, the popular secretary of the Gum Lumber Manufacturers' Association, Memphis, Tenn., has been busily occupied recently enlisting men in the 20th Engineers (Forest) Regiment.

Forms for Furniture Factory Cost System

Secretary of Furniture Manufacturers' Association Presents Simplified System—Recommends Securing Expert's Advice Preliminary to Installation

By W. Cawkell



THE actual initial forms necessary for a cost system are few in number, but they can be elaborated upon to meet the special requirements of any particular factory. In this article it is my purpose to state as briefly as possible what are actually required. In the first place there is a time ticket, or time card, on which is to be recorded the workman's name and number, or his initials and number, the job number, operation number and the machine number, the time he finishes the job and the time he commences. By deducting the one from the other you get the net time employed on that particular job.

I recommend that a separate card be used for each job. This gives the most accurate results, and accuracy is what is essential to the establishing of a true cost system. These tickets are put into a box by the workman immediately he finishes each job, and the following morning the boxes are opened and the tickets taken down to the office by the foreman. They are first given to the time clerk, who checks the time marked on these cards with the time registered on the time clock. You thus establish the fact that the time you are paying for equals the time you are charging for on the different work done.

The cards are then handed to the cost clerk, who sorts them according to the different job numbers, and then enters them on the job assembly sheet. This is a large sheet (see Fig. 1) which has been opened up when the work was first put through. It contains the cost of lumber and all materials, and on it are entered in columns the time cost of each operation. After the time cards have been entered upon these sheets they may be destroyed. These large sheets are usually kept in order of job number on files, and they may be subdivided according to the different classes of work. For instance, dressers would be on one file, buffets on another, chiffoniers on another, and so on. They are kept on these files until all the work on any particular job is completed. By referring to these sheets you can tell at any time how far a job has progressed; and when the job is finished it is then possible to ascertain the cost on the day following the one on which the job is completed.

Case No. Job No.
No. of Cases Color Started Finished
Instructions

Name of Machine	Total Cost	Material
Breakout Saw		
Rip Saw		
Roughing Planer		
Jointer		
Gluing		
Finishing Planer		
Moulder		
Drum Sander		
Glue Jointer		
Double Cut-off Saw		
Tenoner		
Finishing Saw		
Shaper		
Re Saw		
Band Saw		
Dovetailer		
Lock Machine		
Boring Machine		
Spindle Sander		
Belt Sander		
Mortiser		
Carving Machine		
Finishing Sander		
Veneering		
Cabinet Room		
Setting up		
Fitting		
Sanding		

Material Cost
Machine Cost
Cabinet Room Cost
Finishing Room Cost
Factory Expense

Fig. 1—Job assembly sheet.

Form No. 211

TIME TICKET DEPT. NO.

NAME DC No. 225

Job No.	Operation No.	Machine No.	Part No.			
1723	16	260	8			
JAN 2 AM 9.81		FINISHED				
JAN 2 AM 6.82		STARTED				
2.81		ELAPSED				
Rate or Price	Amount		Total Earned		Expense	
	62					

Fig. 2—Employees' time ticket.

It is desirable to have a special time ticket of a different color for recording any indirect labor which the operator may perform during the day and which cannot be charged up to any job. This time is charged as indirect labor to the department in which the work is done. The style of the time ticket may be varied to suit the requirements of any factory; the one given here (see Fig. 2) is in extensive use.

When a job is completed the cost of the materials are then summarized on the cost sheet, Fig. 1. On this sheet is also given the cost of the different operations; for instance, the cost of the breakout, rip saw, jointer, planer, marking, etc. When these are totalled you arrive at the **direct labor** cost. To this must be added the **factory overhead** and the **selling expense.** The difference between what you get for your product and these totals is the profit.

These cost summary sheets should be filed away according to number, and the files may be subdivided according to the different articles manufactured. By this means you can quickly refer to the cost of each lot that comes through and make comparisons. The final object of costing is to establish as nearly as possible a standard time for each operation. Then this time can be marked on the factory sheet that goes into the factory with the job. Many factories give

the workman a bonus equal to the amount of time he saves on any job. When each cost sheet is completed the amount of materials charged should be journalized so as to ascertain the amount of lumber and merchandise charged out in each month.

These totals are then credited to the lumber and merchandise accounts. The monthly totals of lumber and material taken from the invoice books are debited against these accounts; therefore, when the physical or actual inventory is taken of lumber and materials it should agree very nearly with what the lumber and material accounts show. If this lumber account shows that there should be more lumber on hand than the actual inventory gives it probably indicates that you have not charged out sufficient lumber on each job; or it may be that you have not allowed sufficient wastage for them. If this costing of your goods detects the lumber or merchandise leakage it may easily pay over and over again for what the system has cost you.

You must not attempt to make your factory fit a cost system. Before putting a cost system in you are recommended to consult a specialist who will study the conditions and put in a cost system that will fit your factory. If this is done the writer is convinced that the cost system will be a good investment, equal to any other money-saving machine you have installed in your factory.

An Economically Operated Furniture Factory

Generates Own Electric Power on Nearby River—Machines Operated by Individual and Group Drive Motors—Special System of Fire Protection

Staff Article

One of the most economically-operated furniture factories that has come to our attention for some time is that of the Durham Furniture Company, Ltd., Durham, Ont. The lines manufactured are made principally of native hardwoods, although these are supplemented by large quantities of gum and some plain oak.

While speaking of gum lumber, it is worth mentioning that the Durham Furniture Company have never experienced any difficulty in drying and manufacturing this material into furniture. They state that their experience with gum has been highly satisfactory. As evidence of this they have in their yard 500,000 feet of gum, which constitutes a recent purchase.

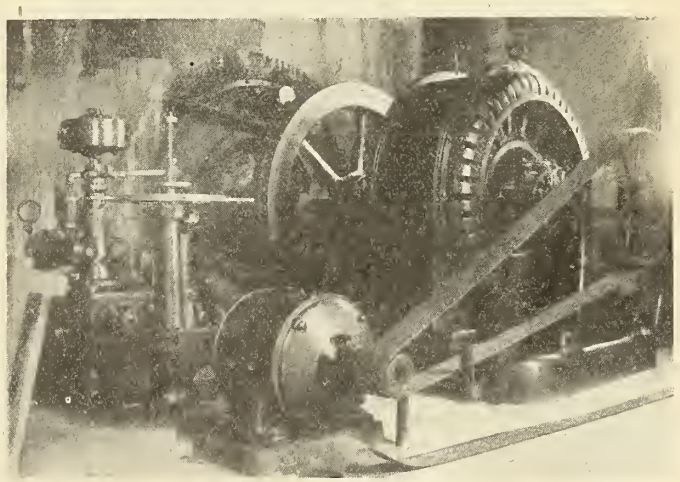
The principal feature of the Durham Furniture Company's business is that it depends very little on outside organizations except for its supplies of hardware, mirrors, finishing materials, etc., and for the distribution and sale of its product. The company own extensive timber limits and operate three sawmills, one of which is located in close proximity to the furniture factory. The other two are a few miles distant. In order to conserve their own timber limits as far as possible and refrain from conducting woods operations under present heavy operating expenses logs are purchased from farmers in territories adjacent to the sawmills. The company are, therefore, able to manufacture lumber at favorable prices. The capacity of their three sawmills is approximately 35,000 feet daily, operating with full complement of men.

In an enterprise of this kind one of the essential things is to be able to utilize the various grades of lumber, as ordinarily the lumber producer disposes of his product to manufacturers whose requirements differ. Mr. Catton, managing director of the Durham Furniture Company's plant, explained that his company experienced no difficulty in this regard. The lumber is graded to suit the company's line, and any that is found unfit for consumption in the factory is cut up for crating.

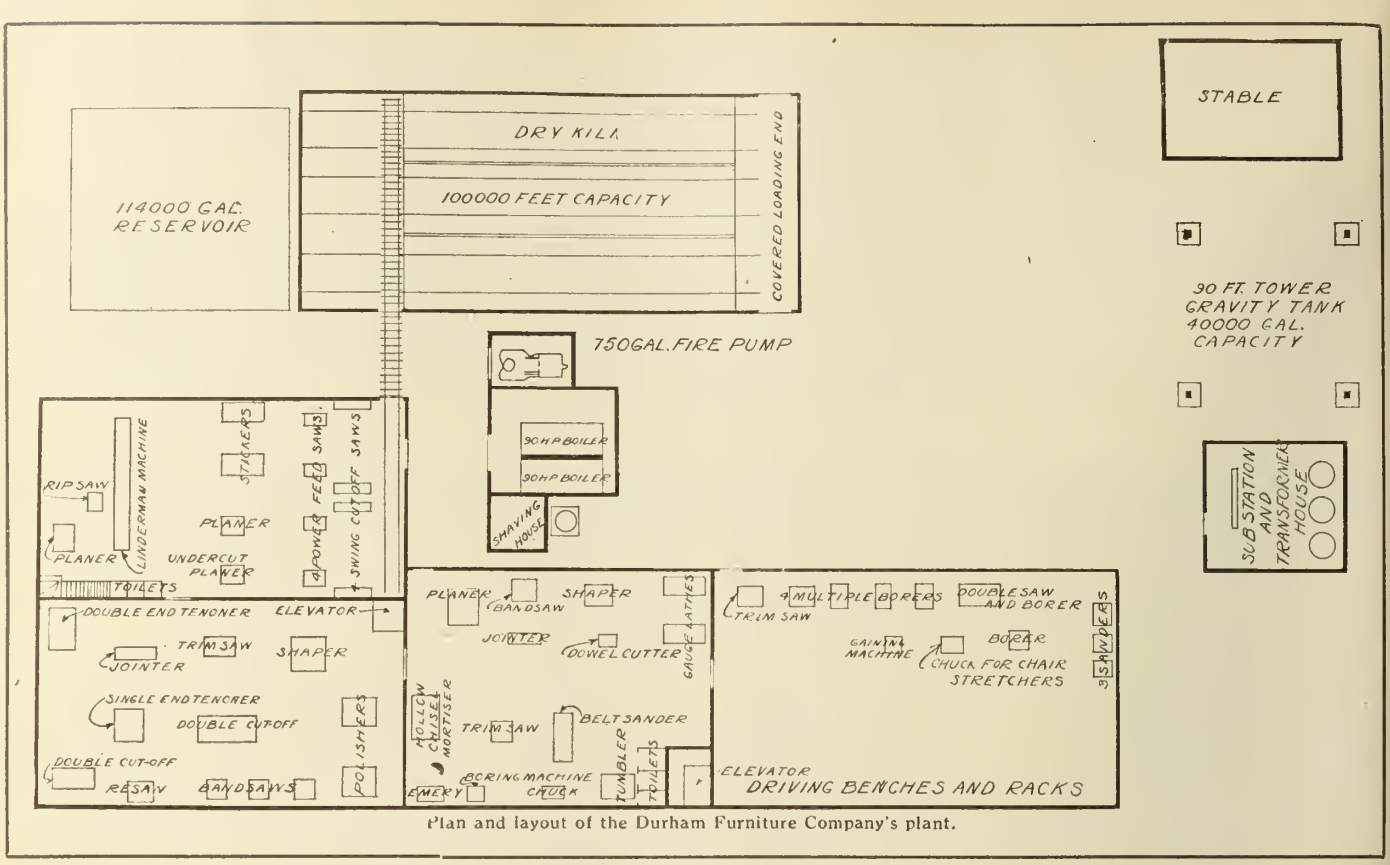
The plant is operated entirely by electric motors, current for which is generated at the company's own power plant about four miles distant on the Rocky Saugeen River. Two boilers are maintained at the plant to supply steam for heating the factory and for the dry kilns. The sawdust and shavings from the factory provide sufficient fuel for heating the boilers; no coal is required. The edgings which are cut from the stock in the machine room are sold locally for kindling wood and light cooking. The waste is, therefore, almost nil.

Individual motors are used wherever possible, but in the case of some of the lighter machines, such as the band-saw and spindle carvers, shown on the accompanying plan, the group drive has been adopted. Alto-

Durham Furniture Company's dam and power house.



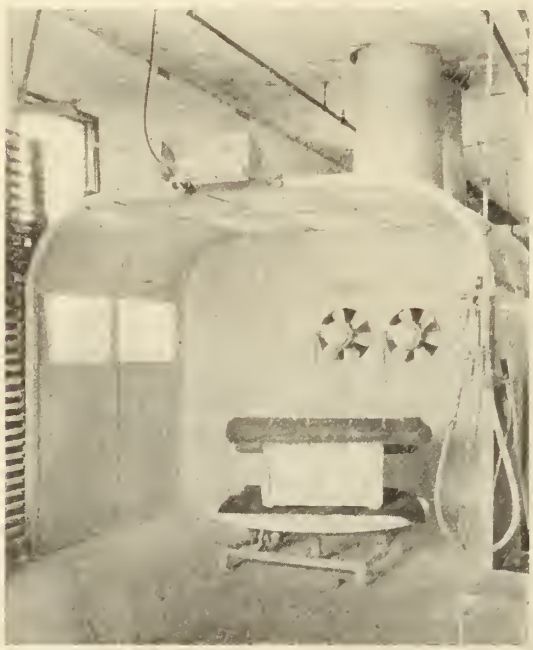
The generator in the power house.



Plan and layout of the Durham Furniture Company's plant.

gether there are 58 motors in use. Some of the motors are direct connected, while others drive the machines by means of short belts. The management of this factory state that short belts, in comparison with long ones, are quite satisfactory, and none of the latter are in evidence.

The electrical equipment of this plant provides a very flexible arrangement. After the main feed wires enter the building the current is distributed by means of other wires to fuse boxes on the walls in different sections of the factory. Each fuse box is provided with a switch and takes care of the motors in one section. If a motor has to be repaired or replaced it is only necessary to shut down one section for a few seconds while the fuse belonging to the damaged motor is detached.



DeVilbiss spraying machine rigged up for spraying glass frames.

Economical production is assisted at the Durham Furniture Company's plant by the following equipment: A dry kiln supplied by Sheldons Limited, of Galt, Ont.; a 36 in. surfacer, made by Jackson, Cochrane & Co., of Kitchener, Ont.; Linderman jointer, which is operated continuously; undercut planers, power feed rip saws, twin cut-off saws and trimmers, automatic and multiple borers, four-sided moulders, 42 in. solid bed; also 42 in. revolving bed polishers, besides the numerous smaller machines. In regard to the Jackson-Cochrane three-drum sander, the management state that in fifteen years of steady use it has not cost them a cent for repairs.

The finishing room is on the same highly efficient basis as the rest of the plant. Two DeVilbiss Aeron System finishing machines, with 8 ft. fumexers, are in use, and a graining machine for making imitation oak, made by the Grand Rapids Panel Works, Grand Rapids, Mich. Although the DeVilbiss machines have only been set up and in operation about three weeks, the operators are already quite efficient. One machine is used for applying varnish and another for enamelled furniture. On the latter it applies both the priming and finishing coats. Mr. Catton is well pleased with the work of these machines, and pointed out to the writer the evenness of the coats and the speed at which they can be applied.

One of our illustrations shows how the finish is applied on glass frames. A box with protruding points is placed on the turntable and the frames placed on top. The points keep the frames from slipping, while at the same time providing a space under the frame so that the bottom edges can be coated without danger of the finish running. A large sheet of paper is pressed down over the points, so that when the finish accumulates

the paper can be removed and a fresh piece put on.

The Durham Furniture Company's factory buildings are thoroughly modern in every respect. They are of brick construction and equipped throughout with a sprinkler system. In addition to the sprinkler system, which is supplied from an elevated tank, capacity 40,000 gallons, a fire pump has been installed, with a reservoir containing 114,000 gallons of water to draw from. Hydrants are located in convenient positions in the factory grounds, to which the fire hose can be attached if necessary. The arrangement is such that the fire hose can be supplied from the elevated tank for the few minutes that it takes to get the fire pump going. The pump also serves to pump the water to the tank. With this system for the control of fire, the company enjoys a rate from the underwriters which is considered exceptionally low—namely, 25 cents per $100.

The company's pay-roll is between $90,000 and $100,000 a year. The Hon. Dr. Jamieson has been president of this company since its inception, nineteen years ago, and takes a keen interest in its welfare.

Practical Drawings for the Chair Factory

Writer States That Ability to Make Perspective Sketches is Asset to Draftsman—Recommends "Rods" for Factory Use as Means of Doing Away with Unnecessary Amount of Patterns

By W. J. Beattie

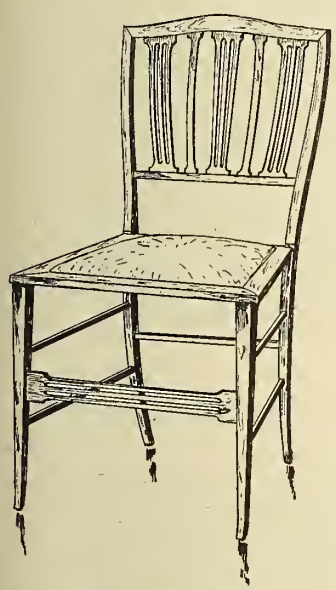


Fig. 1—Sheraton chair.

PRACTICAL working drawings for chairs do not differ materially, so far as general rules are concerned, from similar work for the average furniture factory. It is a decided advantage for a chair draftsman to be able to make reasonably good sketches of chairs, so that he may be able to embody his ideas in a tangible manner and show them to the manufacturer, who can see at a glance how the finished article will appear, enabling him to make an intelligent criticism before the detail drawing is begun.

The seat heights of the various chairs are practically standard, and are always known beforehand. The heights of the backs vary; also the area of the seats, but not very much; so that there is a certain well-defined limit to keep within.

It is not so easy as it looks to make a good sketch of a chair freehand, and the best way to get practice in the art is to place the chair to be sketched in a convenient position and go at it. When sufficient practice has brought a degree of skill, try another position, etc. By using chairs for object drawings, after a good deal of practice it will not be such an arduous job to originate ideas and transfer them to paper.

The perspective is done solely by the aid of the eye, not as the chair really is, but as it appears. There is a sure mechanical way to accomplish this, but the freehand method cultivates the eye and hand to a degree that is a real asset to a draftsman. Many furniture designers draw the interiors of rooms, with their complete furnishings, solely by eye, deciding on the vanishing points with such accuracy that not the least deviation from mechanical exactitude is apparent.

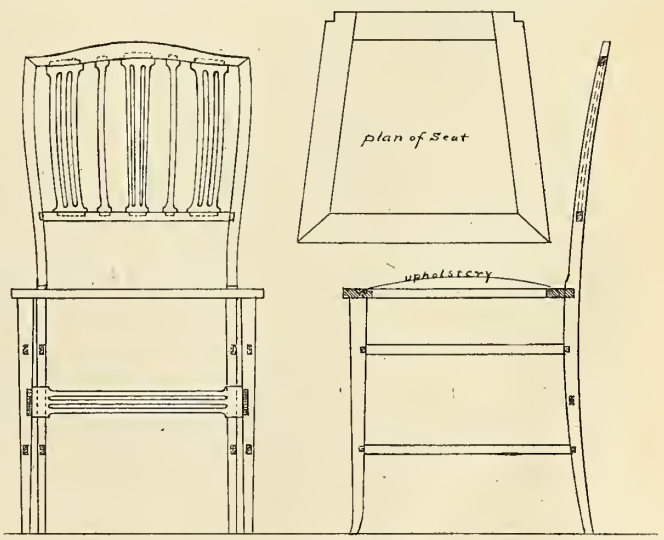
The drawing of still life objects in our art technical schools is splendid training along these lines. Fig. 1 is a sketch from a water-color of a chair sent to the writer by a Canadian soldier in England, who attended a finely-equipped technical school, a few miles from camp, during the spare evenings at his disposal, and who is now at the front. His remarks on the technical schools of England would, I fancy, be fairly interesting to readers of the "Canadian Woodworker." The chair (Fig. 1) is on Sheraton ideas, made of mahogany, with inlaid lines, and looks much better in colors than in black and white.

The working drawing of this chair, as shown, is a front elevation; also side view and seat plan. It is such a simple piece that it is quite apparent to the practical mind. No matter how elaborate the chair may be, the same method would be the one followed, with the extra detail necessary.

After the drawing has been completed on paper the stock bill is taken off, giving the finished sizes, each part numbered, beginning at the back legs first as No. 1, front legs No. 2, etc. There is no hard and fast rule in this regard, but it is well to have a methodical manner in the matter of taking off a stock bill, which is quite apparent.

After the stock bill and band saw patterns are taken from the drawing the sample chair is put up for criticism, and, after being passed, with any alterations noted, it is ready to be finally "planted" on a rod, which is simply a piece of ½ in. basswood of sufficient size to accommodate the front elevation on one side and the side elevation and seat plan on the other.

The bandsaw and shaper patterns are used to mark the rod with, and as these have been perfectly shaped



Working drawing of Fig. 1.

regarding curves, line, etc., the rod is then an authority for all future reference. The various parts of the chair shown on the rod are numbered to correspond to the stock bill. The stock bill is a card about 6 in. by 9 in., printed on two sides, and will accommodate a pair of chairs, the arm and side chair, etc. These stock bill cards can be filed numerically in an indexed file.

The stock bill contains the amount of material required in each item, as well as all sizes and machinery information. For instance, the first item, two back legs,

Fig. 2—Chair on Adam lines.

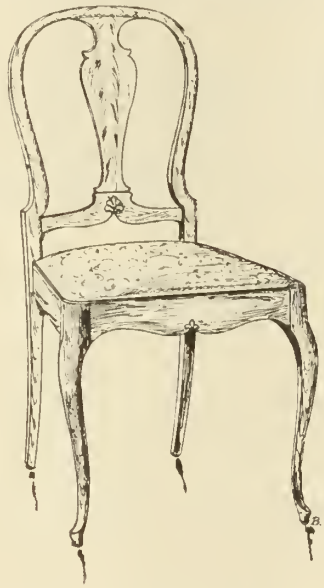


Fig. 3—Queen Anne design.

length, width, thickness, followed by the size of a piece of material that would make, say, a dozen legs. The size of this piece can be decided upon by taking the band-saw pattern and laying it on a piece of drafting paper and finding out how many legs can be cut from a piece of material of a convenient and economical size. Do not simply state "see pattern," as this does not give any information as to the amount of material required.

When the manufacturing tag is written, the information states that material of the size given makes so many legs, and the pattern is not used until the band-saw is reached. The above rule would apply to any portion of a chair where the parts can be worked into one another and thus save time and material. The perfected band-saw patterns are used to mark the shaper patterns from, and if there is anything more important in the manufacture of chairs than good shaper patterns, what is it?

To refer again to the rod, or wood drawing, this should be of nice, clear stock, sanded and given a couple of coats of thin white shellac. The board should be perfectly straight and the two edges parallel, so that work can be done from either edge. The front elevation should be laid down, working from a centre line, using a "long-range" marking gauge, square, lining knife, India ink, etc. The tools used for rod-making were illustrated in an article on rod-making by the writer, published a few months ago in the "Canadian Woodworker." After the rod is completed it should have a coat of durable varnish applied, which will keep it clear and legible.

The use of a carefully made and absolutely accurate rod of this kind does away with the necessity of carrying the large number of patterns that would be required for bevels, mitres, etc. These are an awful encumbrance in many chair factories. The amount of patterns and general junk that is seen hanging on the ceilings and walls of some plants is certainly bewildering. The parts of the whole chair are hung up, and it is needless to say that in some cases the size and weight of the bundles is considerable, and as a collector of dust it is really a first-class mess.

The construction of chairs must always be along lines of strength and rigidity, keeping in mind the uses to which the various kinds of chairs are likely to be put. The chairs shown are not of the kind that are likely to be subjected to rough usage. Consequently they can be made as pleasing to the eye as possible and still carry the necessary element of strength. As the back legs of them all are full length, they can easily be made very serviceable.

The best quality of glue is vitally necessary to the life of a chair. Chair manufacture calls for the very best material, faultless machine work, and the same kind of bench work. These are essential in order to produce goods of a high order.

Fig. 2 is a sketch of a chair on Adam lines—plain and square, giving the appearance of neatness. The tapering front legs produce the effect of lightness without sacrificing strength. Carving of very low relief could be used or not, with the exception of the top ornament on the chair slat.

Fig. 3 is on Queen Anne lines, and depends on the beauty of curved lines, which must be carefully drawn and executed to produce a pleasing effect. This chair is severely plain so far as ornamentation is concerned, but when made out of selected mahogany or walnut, with harmonious upholstering, would be a good example of chair manufacture.

Carved Blackwood Suite

The suite of furniture shown on the opposite page comprises eighteen pieces. It is made of carved black wood, or "Sin Jing," and was originally in the Council Chamber of the British Embassy at Hong Kong. In 1861 Lord Elgin signed the famous treaty ceding Hong Kong to Great Britain on this table.

This furniture was carved by Kwong-Man-Shing, Queen's Road, Hong Kong. It was purchased and brought to Canada by the late Robertson Macaulay, of Montreal. It is now in possession of B. M. and T. Jenkins & Co., dealers in antique furniture, who showed it at the recent Toronto Exhibition.

A feature of the suite is that there is no nails, screws or glue used in its construction. The parts are all fitted together by blind dovetails. It can be taken apart and set up again very easily.

Mirror Firms Adopt U. S. Standards

Canadian manufacturers of mirrors have recently issued new price lists which are based on a different set of figures from those previously used. Formerly the bulk of the mirror plate used in this country was imported from England and accordingly the English standard of figuring was used. Now that the mirror manufacturers are obtaining the bulk of their mirror plate from the United States, the U. S. standards have been adopted. Mirror prices have recently advanced from 10 per cent. up, according to the sizes.

When you are convinced that you have made a mistake, own it—frankly and fairly. Your very frankness will dispel half the displeasure of your employer or your customer—whichever the mistake affected.

Carved blackwood suite shown at the recent Toronto Exhibition. This suite was made originally for the British Embassy at Hong Kong.

One of the furnished rooms shown at the Toronto Exhibition by the T. Eaton Co., Limited, Toronto

Organizing the Purchasing Department

How to File Manufacturers' Catalogues—The Supply Order and What It Should Convey—Recommendations from Foremen—Minute Specifications Necessary

By W. Alexander

TIME was when the furniture manufacturer looked after the entire business of his plant — buying raw materials, superintending the shop, selling, etc. Now, in the larger factories at least, each of these functions is taken care of by a separate executive, who engages such departmental assistance as may be required. The department to which I propose to give some attention in this article is the purchasing department. It is one of the vital departments of the business, and upon its wise administration depends in large measure the success of the firm.

The executive in charge is usually called a purchasing agent, and the position demands a high-grade man. He must be a man whose honesty is never for a second in doubt, because certain unscrupulous salesmen will undoubtedly try to persuade him to accept a "rake-off" as an inducement to purchase their goods. The purchasing agent who "falls" for such a proposition is done for. He places himself at the mercy of the salesman, and is bound to accept his goods, even though they are inferior, for fear of exposure.

Sound judgment, wide information, and ability to forecast accurately market conditions and price fluctuations are some of the qualifications the purchasing agent should possess. Above all, though, he must be able to impress salesmen with the fact that he knows his business and that it is no use trying to sell him a worthless article. The difference in the quality and price of raw materials purchased by a man possessing the knowledge indicated above and those purchased by a man not so well posted might pay a competent man's salary three or four times over. It will be inferred from these remarks that the purchasing agent should receive a good salary. He should. His job requires training and study, and his work is valuable. Lack of exact specifications of materials required has cost many furniture factories a great deal of money.

TABULATION OF PRICES
GENERAL PURCHASING DEPARTMENT

MATERIAL _____ SPEC No _____
OWG. No. _____

SUPPLIER	DATE	QUANTITY	PRICE	DISCOUNT	F.O.B.	DELIVERY	LOCATION OF FACTORY	TERMS	AUTHORIZED GEN'L PURCH AGT.

LAST PRICE DATE	PRICE ONE YEAR AGO	DATE	LOWEST PRICE ON RECORD	DATE

REMARKS

Fig. 1—Form for tabulating replies to price inquiries.

ARTICLE										CATALOG PAGE.				
NAME					NAME					NAME				
TERMS				DEL'V'O	TERMS				DEL'V'O	TERMS				DEL'V'O
QUOT'N	ORDER	PRICE	PER	DISC'T	QUOT'N	ORDER	PRICE	PER	DISC'T	QUOT'N	ORDER	PRICE	PER	DISC'T
NAME					NAME					NAME				
TERMS				DEL'V'O	TERMS				DEL'V'O	TERMS				DEL'V'O.
QUOTN	ORDER	PRICE	PER	DISC'T	QUOT'N	ORDER	PRICE	PER	DISC'T	QUOTN	ORDER	PRICE	PER	DISC'T.

Fig. 2—Quotation card.

Catalogue Files

The purchasing department should keep a complete file of up-to-date catalogues. The latest catalogue of every manufacturer in the country dealing in the goods used by the company should be on file. The catalogues should be filed in such a manner that easy reference may be made to them, either by the manufacturer's name or the article required.

This can be arranged by a cross reference index, in which the catalogues are referred to by names and cross reference made to the materials handled by each manufacturer. An alphabetically-arranged list should also be kept of the names and addresses of the manufacturers of these materials. It is a good plan to assign a code number to each article used and keep a card file, arranged by numbers. On the card is shown the names of all the firms who supply that particular article.

Thus when any goods are desired the purchasing agent can refer to these lists and send out enquiry blanks to the manufacturerers. The replies should be tabulated on the form Fig. 1. The order can then be placed with the lowest bidder, the matters of quality and delivery dates having been duly considered.

The supply orders sent to the purchasing agents by the various department foremen should contain com-

Supply Order No.

Please Order for Opt No. Date.

On Hand	Will Last	Quantity Wanted	Description	Quantity Delivered	Price	Amount
					F.O.B.	

Purchasing Agent's Notation. Bought of

Delivery Promised

Signed P.A.

Approval of Purchase Foreman

Superintendent Date

Approved for Payment Auditor Date

Fig. 3—Supply order form.

plete information, including a correct technical description of the goods wanted, with a statement of the quantity on hand, the time it will last, and the earliest date when the material will be required in the plant.

The purchasing agent should have a good knowledge of transportation routes. On carload shipments, where the goods are sold to the firm on the basis of f.o.b. shipping point, the route over which the material is to be shipped should be given to the shipper on the order. On goods not immediately required there is often an opportunity to effect a saving by routing the material indirectly instead of over the fast freight lines. Furthermore, on less than carload lots there are often chances of saving in freight charges through proper routing instructions. It is very necessary for the purchasing agent to keep himself informed regarding embargoes, car shortages, etc. Follow-ups should be started as soon as instructions are received that the goods have been shipped. In this way there is no danger of shipments being overlooked or sidetracked through want of looking after. The shipper should be required to secure from the car company the number of the cars in which the goods were loaded.

One point that should not be overlooked is that departments requiring material should place their orders with the purchasing agent in ample time for him to secure quotations and make the proper enquiries in the market to enable him to secure the lowest possible prices and still allow a reasonable time for delivery.

Testing Samples

Wherever possible, tests should be made on samples of materials submitted by manufacturers and a report sent to the purchasing agent showing the results of such tests. Notes can then be made on the quotation cards. A good form of quotation card is shown in Fig. 2.

Uniform standards for all materials should be adopted wherever possible. Investigations will often prove that this uniformity can be secured in almost all lines of supplies purchased. Where this is done the work of the purchasing department is lessened; the department is, furthermore, able to secure better prices and to place long-time contracts to better advantage. Manufacturers or supply houses from whom materials are purchased should always be furnished with minute specifications. By doing this it is possible to secure closer prices. Where standards are not uniform, or where materials ordered are of special character the manufacturer will always make a liberal allowance for uncertainties.

From the purchasing agents' point of view, competition is the life of the trade. Orders should, therefore, be placed in strict conformity with the terms of such competition. Favored concerns should not be permitted to meet the figures of others if their figures are out of line in the first place. Such practices soon get to be known, and often cause other sellers to withhold their best figures.

Recommendations from Department Heads

The purchasing agent should be given a free hand. If manufacturers and supply men are given to understand that the purchasing department is the court of last resort in matters affecting purchases better results will be obtained. If it once becomes known that suppliers can go over the head of the purchasing agent, the position of purchasing agent becomes a mockery. It should be made a rule that all information regarding specifications and requirements must come from the purchasing department. It is all right for department heads to make recommendations in the matter of purchases, but they should not be permitted to go beyond the recommendations.

The storeroom should not be under the control or supervision of the purchasing officer, but at the same time it is necessary that there should be the closest cooperation between the two departments, so that the investment in supplies may be kept at a minimum consistent with safety. The storeroom receives the goods on arrival from the unloading platform, accompanied by the receiving clerk's record. As goods are required by departments, the department head should draw a

Blank Manufacturing Co.

Purchase Order No. Date

To

Please deliver at the following order in accordance with your of

F.O.B.

Delivery to be made not later than

Mail invoice to

Instructions:
Ship only the quantity, show the above order number on invoice. Route Via.
Supply other instructions as desired.

Signed

Purchasing Agent

Fig. 4—Suitable order form for purchasing agent.

requisition on the storeroom and sign a receipt for the goods when his department receives them.

These requisitions are then priced and sent to the bookkeeping or cost department for proper charge to production expenses. The detail credits to stock are posted on the stock cards from the individual requisitions. The material and supplies account in the general book becomes, therefore, a controlling account for

the materials, furnishes individual card records, and at the end of any fiscal period the total of the balances on the individual cards should tally with the controlling account in the general ledger.

A physical inventory should be taken whenever stock is low and compared with the book inventory as shown by the storeroom records. The book inventory should be adjusted to the physical inventory, the entries being recorded in the general books as well as on the material cards.

The supply order originates either in the store-room or in the department. A suitable form of supply order is shown in Fig. 3. Each department or storeroom should be given a number or symbol, to be used in identifying its supply order. These should be numbered consecutively. The supply order should be approved by the department foreman and also by the superintendent or factory manager before it is handed to the purchasing agent. The purchasing agent, on re-

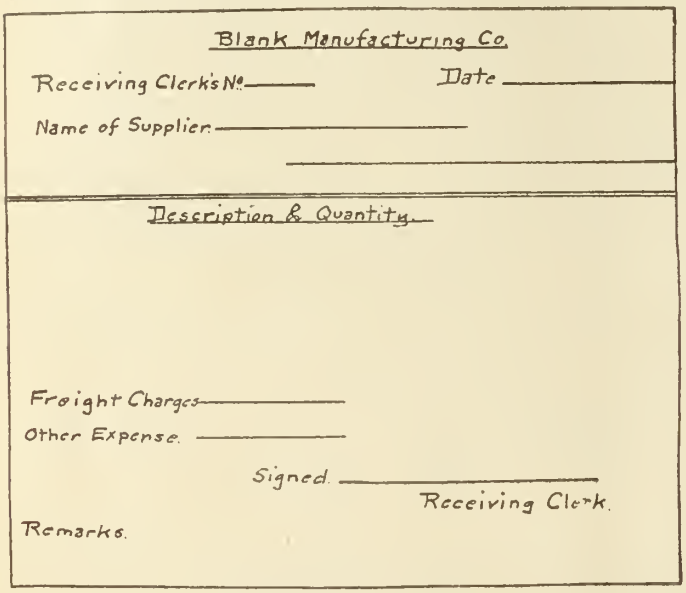


Fig. 5—Receiving clerk's record.

ceipt of the supply order, sends out his enquiry list for prices, or, if the goods wanted are covered by a contract, he places the order accordingly. The order issued by the purchasing agent is similar in form to that shown in Fig. 4.

A good system to follow is to send the original order form to the firm from which the goods are ordered, a carbon to the invoice desk, another copy to the receiving clerk, a copy to the department ordering the goods, and a final copy retained by the purchasing department for its files. The purchasing agent then fills in on the supply order the details of the purchase and, after signing it, forwards same to invoice desk. His functions are then completed with the exception of the follow-up mentioned above.

Handling Invoices from Shippers

When invoices arrive by mail they should be sent immediately to the invoice desk, to await the arrival of the goods. In some cases invoices will arrive with the goods. When this occurrs they should be sent directly to the invoice desk. When goods have been counted and checked by the receiving department the receiving clerk sends a copy of his record (Fig. 5), with the goods, to the storeroom or department, and a copy to the invoice desk, retaining a third copy for his files. Attached to the receiving clerk's record sent to the invoice desk should be paid freight bills, if any, or a memorandum of any other expense properly borne by the supplier according to the terms of the purchase order.

The receiving clerk's record sent to the invoice desk, with its attached freight bills, makes the file complete. The invoice price is compared with the purchasing order price by the invoice clerk. An independent extension is made on the supply order and compared with the extension and footing on the supplier's invoice. If everything is found in order, the papers are fastened together and the invoice is ready for payment.

The reader will realize that by this system the main burden is placed on the invoice desk, and, in the writer's opinion, that is where it properly belongs, as the work of checking invoices and approving them is essentially bookkeeping, and finds no proper place in the purchasing department. Th work of the invoice desk is, however, of sufficient importance to warrant the employment of a competent person who will see that the proper charges are made to the accounts in the ledger. The duty of watching the discount date falls on the invoice department.

When the purchasing agent enters into long-time or quantity contracts it is well for him to send the details of such agreements to the invoice desk. He should also arrange to keep a record of the amounts ordered to date on such contracts. This can be done by attaching to each contract a separate sheet on which to indicate the purchase order number, the date when given, and the quantity ordered. Very often there is a time limit on deliveries and quantity discounts on contracts, and it is quite necessary for the purchasing agent to keep a watchful eye on the details of such contracts.

The purchasing agent must be wide awake to market conditions. Some purchasing agents insert an agreement in long-time contracts to the effect that if during the life of a contract the seller shall reduce his selling prices the firm shall receive a corresponding benefit in its prices on goods delivered under the contract. This provides for protection against higher prices and hedges on the matter of lower prices.

Atkins Silver Steel Saw Club

E. C. Atkins & Company, Indianapolis, Ind., and Hamilton, Canada, recently mailed to the members of the Atkins Silver Steel Saw Club a little sales talk entitled "The Straight Road." The Silver Steel Saw Club is composed of retail hardware salesmen, and E. C. Atkins & Company send sales talks to the members at intervals.

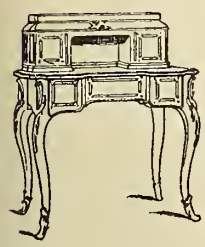
In the latest talk, "The Straight Road," the point of the argument is that the salesman should analyze the conditions and approach his prospective customer with his arguments firmly fixed in mind and then pursue these arguments to a successful conclusion, the arguments having been chosen, of course, in accordance with the customer's possible requirements.

Point is given to the talk by an illustration wherein a retail hardware salesman sold an Atkins' saw to a carpenter who entered the store to purchase something else, and who, apparently, was not at the moment interested in saws. By diplomatically calling the carpenter's attention to the good points of the saw, and incidentally to a time-book and saw charm which went with each saw, these being distributed by E. C. Atkins & Company through the dealers, the carpenter finally evinced interest and purchased the saw.

The Trend of the Furniture Styles

Writer Says United States Sets Fashions for Canada—Queen Anne Period One of the Leaders —Purely American Style May be Looked For

By Walter Wrench

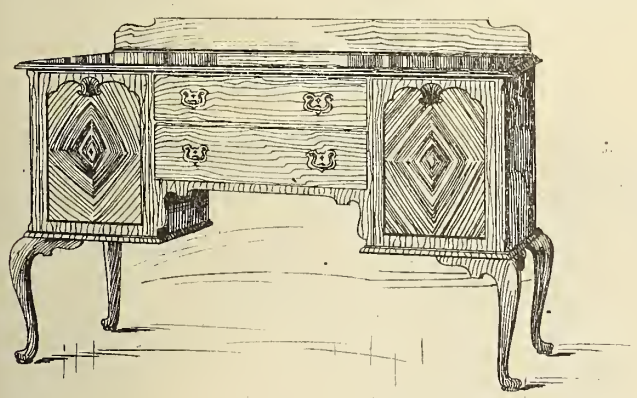


JUST as Paris dictates to the world the fashions in women's attire, so does the United States, to a lesser degree, dictate to Canada the fashions in furniture. The invariable rule is, that what is popular in the United States today, will tomorrow be the accepted style in the Dominion, the tomorrow being represented by a lapse of six months, as a general rule.

It would be interesting to investigate the principles which govern fashion leadership in furniture styles just to find out why the Canadian manufacturer is compelled to follow after his American cousin and never to lead, but to do this would involve a close study of the foibles of human nature, the blind following in the set paths which is characteristic of most of us, and this is far from the purpose of this article. Briefly put, it is a matter of prestige, of reputation possessed by a great nation who popularize their product by intelligent publicity. To label a hat "The latest from New York," sells the hat. Would a hat sell the better for being labelled "The latest from Toronto"? Ask any retail dealer.

With furniture, only a few of the old established manufacturers in the United States actually introduce the new styles or by adoption popularize one of the strictly period styles, and these leaders among the manufacturers are slavishly followed by the lesser factories, the latter maybe realizing that they will benefit by the publicity campaign with which these big men in the furniture world herald their new productions.

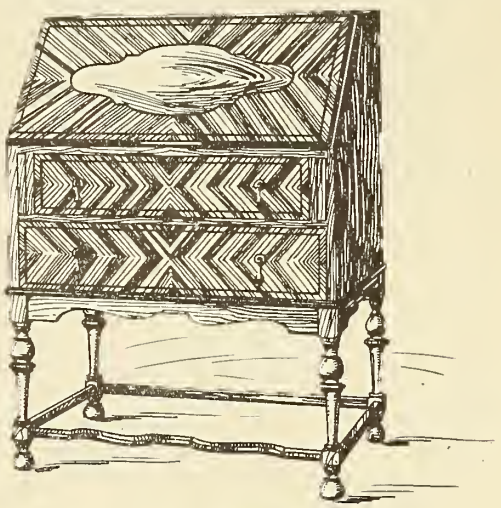
The goods are imported by the Canadian retail furniture trade and featured, whereupon our manufacturers, forced to yield to the popular demand, copy the styles as they stand in some cases or at best design lines for themselves based upon the imported samples. It is a common custom also for Canadian



Sideboard on Queen Anne Lines

manufacturers to visit the exhibitions and buy up samples which seem to be popular, with the express intention of copying them. As this is the case, much as one would wish it were otherwise, one has but to examine the offerings of the manufacturers in the United States to be reasonably sure of the trend of furniture fashions as they will eventually effect this country.

Outstanding among the offerings this year is the Queen Anne style, both in dining and bedroom suites, and there is every indication that the style will lead for at least another season as first favorite, and then will become one of the staples for which there will always be a certain demand. It is more than likely that the style was popularized because of the demand made for American walnut, which is a wood eminently



A Desk in the William and Mary Style.

suited to the period. The manufacturer will make no mistake in making up a line in the Queen Anne period, for while the demand for walnut is insistent, the style will obtain its full share of public patronage.

The suites in this style produced in Canada have been, with one exception, strikingly plain. A more extensive use of veneered burr walnut panels as applied to doors and drawer fronts, and quite in keeping with the style, may be confidently looked for.

William and Mary, with special reference to dining room suites, continues to have a considerable following, and one is safe in saying that it will sell well for another year to come, particularly in the cheaper lines. A great deal of the modern furniture of this style is made of mahogany, whereas walnut is the wood that should be used. Some oak was used in this period as well, and this fact may prove a vital factor in continued popularity for this period style, should the extensive boosting campaign by the American Oak Manufacturers' Association have its expected results.

Italian Renaissance has been featured by some manufacturers of established reputation in Grand Rapids and New York, but its effects will not yet be felt in Canada, and might well be left alone for a year, at any rate. The writer is of the opinion that it will never be a really popular style in this country, that is to say, as purely commercial furniture sold to the

masses, or indeed, in the United States, unless modified and adapted out of all resemblance to the original types.

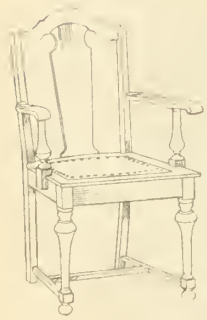
Of the staple lines for which there will always be a demand, nothing is safer than Louis XVI. for bedroom furniture. It is a style that has certainly "taken on," and there is no doubt about its ability to last many years yet in popular priced lines. Chippendale with pronounced Chinese characteristics continues a good seller, but it is not to be compared with Louis XVI. in this regard.

Generally the tendency is for lighter and more refined styles. One might say that any type of furniture possessing the requisite artistic merit which could be put on the market at a reasonable price would achieve a certain measure of popularity. While all the period styles are here to stay for many years, evidences are not wanting to prove that the time for the introduction of a style more purely American is at hand, and this style, by the way, will be far removed from the clumsiness of what has hitherto been the accepted American style—Mission.

Manufacturing Chairs in Specialized Plant

Describing Operations of the Canadian Rattan Chair Company, Limited, Victoriaville, Que. —Large Factory Making Rattan and Wood Chairs Exclusively

Staff Article



ALTHOUGH it does not compare with some of the Ontario towns, Victoriaville, P.Q., is quite a busy little centre, from the woodworking point of view. One of the most important industries in this line is the Canadian Rattan Chair Company, Limited, wholesale rattan and verandah chair manufacturers, of which Mr. Paul Tourigny is President and Mr. J. D. Gagne managing director. The company was formed six years ago to make rattan goods, and five years later took over the Victoriaville Chair Company, whose specialty was wooden chairs. The latter business has now been incorporated with that of the purchasing company, and the manufacture of both classes of chairs concentrated in one building.

The plant is an extensive one, and comprises a manufacturing building and a very large storage warehouse, the latter alongside a spur of the G. T. R., goods being shipped direct into the cars. The shop is 300 ft. by 60 ft., and is mainly of the one-storey type, with two kilns, one 85 ft. by 17 ft. and the other 108 ft. by 45 ft. There are seven departments—the machine shop, paint shop, assembling room, bending room, upholstery department, shipping room and storage warehouse, all, except the last, under one roof, and all intercommunicating.

The company manufactures a large variety of chairs, from the plain wooden type to some very fine rattan goods with upholstered seats and backs; also kindergarten sets and small tables. The largest output is of rattan chairs. Birch and elm are the kinds of lumber chiefly used, the latter being employed where wood in a bent form is required. A stock of about 600,000 feet of lumber is usually kept on hand; this is air dried for eight or nine months. The main kiln has a capacity for 13 trucks, each holding 2,000 feet. The lumber is kept here for ten or twelve days, each truck being ticketed in order to show the date when it was put into the kiln.

Lumber required to be turned must be green, and dried afterwards. Such pieces as back legs, stretchers, back posts, verandah chair legs, etc., are therefore made from green wood—that is, not kiln dried—and afterwards placed in a kiln for about 14 hours.

Naturally the bulk of the work is executed in the machine shop—a very long, narrow room. The lumber, after being kiln dried, goes to the crosscut saw, and then to the rip saw. That required for chair seats is jointed, and the pieces glued together on a clamping machine. After being planed, the seats are cut to size and shaped by a band-saw; they are then grooved and bored.

The lumber for rattan chair seats is cross-cut and rip sawed, and sent to the band saw, where, after being cut to size, the pieces go to an assembling machine. Gluing is the next operation, then planing, and then the seats go back to the band saw, where they are cut to shape. Grooving and sanding follow. The company have a very complete sanding equipment, including drum sanders, and jig sanders. Owing to the shape of some of the pieces it is not possible to get satisfactory results from the ordinary sanders, and it is therefore necessary to do a certain amount of hand work.

Quite an appreciable portion of the pieces have to be turned. This has to be done with green wood, as mentioned before, which is first of all cross-cut and rip-sawed. There are three turning machines, which produce work of very good quality. The turned pieces are afterwards stored in the kiln for a certain number of days, to keep them in condition.

A large quantity of the birch lumber is utilized in manufacturing dowels. This is first of all cut into 12-foot lengths, and then after passing through the turning machine and being dried, is again cut up into required lengths for stretchers, back rods on chairs,

Assembly department in the machine room

Machine room in the plant of the Canadian Rattan Chair Company, Limited, Victoriaville, Que.

etc. Seven sizes are made, but ¾ inch diameter is the stock chiefly used.

The bending department is one of the most interesting of the plant. Quite a number of pieces have to undergo a process of bending; for instance, all the back legs, arms for rattan chairs, etc., must be treated in this way. The lumber, after being sawed and turned, is put into iron kilns and steam heated for ten minutes to a high temperature. This softens the wood, which is placed in metal forms, clamped and kiln dried. The backs for the wooden chairs undergo a different process. The pieces are set in a press, each section holding a back; steam is forced into the press, which is also under hydraulic pressure and worked by a pump. The stock remains until thoroughly dry. In a small room running off the bending department, is a machine for embossing the backs. This is done by dies heated with gasoline.

The assembling shop adjoins the machine shop, and is also close to the kiln in which is stored the various turned pieces. This makes for economical handling and expeditious work. The various manufactured parts required are conveyed to the department, cut to size, and if necessary bored, and the turned pieces further finished by being put in a revolving iron drum to take off rough edges (a process occupying about an hour), and slotted. Workmen then assemble the various parts into complete frames of all types of chairs produced by the factory, and also put on the cane seats—which are purchased—on rattan chairs. Prior to being assembled the backs and seats of some of the wooden chairs are printed on a press to give imitation effects of high class veneers.

In the paint shop the verandah chairs receive a coat of either green, red, or natural paint before being varnished. Wooden chairs are stained by being dipped, and others of rattan are stained by hand. Painted and stained goods receive a coat of shellac. The chairs are afterwards sanded by hand prior to being varnished. The varnish is kept warm by means of steam pipes running under the varnish tank. This makes the varnish dry more quickly, while the process is also aided by shutting the doors and windows at night and putting on the steam for several hours. Other rattan goods are dipped in white glue, kept warm by steam pipes running round the interior of the tank. This preparation gives the goods a very white and glossy appearance.

The reeds come in various sizes and shapes, flat, oval, and split, and are sorted into several bins. They are then bleached and sent to another department, where they are weaved on to the frames of the chairs according to the pattern desired. The rough ends of the reeds are subsequently singed by a gasoline torch. Only a comparatively few goods are upholstered, the seats and backs being fastened by clinch buttons.

Packing is the next stage. Wooden chairs, although sent out knocked down, are varnished in complete form. It is claimed that varnishing in this way has the advantage of keeping the leg holes free from varnish, making it easier for the furniture dealer to set up the chairs when he receives them. A very large stock is stored in the warehouse, each class of furniture being kept in separate departments, which facilitates rapid shipment.

The plant is electrically driven, a 50 h.p. motor being installed. The factory is steam heated, the boilers being fed mainly with the shavings, etc., collected by means of a blower system. The machinery was supplied by the following firms: Preston Woodworking Machinery Co., Preston, Ont.; Canada Machinery Corporation, Galt, Ont.; L. C. McKnight & Sons Co., Gardner, Mass.; J. A. Fay & Egan Co., Cincinnati, Ohio.

Female Labor in the Furniture Factory

Experiences of Firms Who Have Tried the Experiment—Some Say Women Satisfactory; Others that They Can Only Compete on Light Operations

The following letters regarding female labor for furniture factory work have been received by the Editor of the "Canadian Woodworker":

No. 1.—We have not, up to the present, employed female labor in our factory, and we do not think that any woodworking factories in this locality have either. Female help is very scarce here on account of there being a large knitting factory and a fruit and vegetable evaporating plant, both of which employ female labor almost exclusively. — Windsor Furniture Company, Ltd., Windsor, N.S.

* * *

No. 2.—We have not so far employed female labor in our factory, and we hope never to be obliged to do it. We do not mean to say that women would not be fit for some kinds of work, not to say all kinds. This has already been proven in practice, especially since this terrible war. But the principal reason why we are against women working in factories in general is that they were not born for that purpose; they were created to be a companion to man; acting otherwise would be reversing the order. Let us keep them in the sphere they have been placed in by God Himself, or else, if we want to reverse the order, let them enjoy all privileges and advantages possessed by men.

Another reason is that women are not physically built to work continuously in factories, and the most disastrous consequences will follow if their employment does not cease. When women of a town or of a country do not get the rest and the fresh air they need for their natural development what can be the consequences if not the weakening of the race and a dangerous diffusion of tuberculosis and other collective diseases We have a very sad proof of this in the old countries.

A good many other reasons could be mentioned, but we think that these two are more than sufficient for those who have at heart the conservation of the race and the nobleness of womanhood.—The Roxton Mill & Chair Manufacturing Company, Ltd., Waterloo, P.Q.

* * *

No. 3.—We employ about 25 girls in our factory, and we find them very satisfactory for small work; but to employ them at the machines it requires great supervision, as they have no knowledge of machinery and accurate sizes ,and it will take some time before we can employ them like men. Their wages are about half of those of men. We feel confident that after a certain length of time they will be better. We have not had long experience with them to give a correct opinion, but it is certainly a great help during this scarcity of labor, which is getting worse every day.—St. Lawrence Furniture Company, Riviere-du-Loup, Que.

* * *

No. 4.—Up to the present we have not employed any female labor, but think they might be used to advantage, and would like to read some discussion on this subject.—The National Table Company, Ltd., Owen Sound, Ont.

* * *

No. 5.—We have about half a dozen young women working in our factory, but we do not think we have enough to get the best results. In our opinion, there should be a large number employed, and under the supervision of a woman of mature years.—The Strathroy Furniture Company, Ltd., Strathroy, Ont.

* * *

No. 6.—Up to the present time we have not employed female labor in our factory. However, we understand that some of the furniture manufacturers have, and if the shortage of help continues we might find it necessary to employ this class of help.—The H. Krug Furniture Company, Ltd., Kitchener, Ont.

* * *

No. 7.—Up to the present we have employed very little female labor in our factory. However, we have found in our experience that it has worked out very satisfactory in the finishing room; also for wrapping in the packing room, besides making of cushions and sewing in the upholstering department. — The F. E. Coombe Furniture Company, Ltd., Kincardine, Ont.

* * *

No. 8.—Our experience varies so much that we are prepared to say nothing on the subject, although we are at the present time operating with girls in almost every department of our plant.—The Meaford Manufacturing Company, Ltd., Meaford, Ont.

* * *

No. 9.—We do not employ any female labor in our factory at all, as this city has so many shirt, collar, and whitewear factories that the girls prefer to work there, where the work is cleaner than that in the furniture factories.—Jacques Furniture Company, Ltd., Kitchener, Ont.

* * *

No. 10.—We have ladies employed in our plant in the different departments, such as our finishing department, gramophone department, shipping department, and machine and cabinet departments. We find their services are very satisfactory in these times, but the output is not as great as with male labor. The prospects are that as soon as the ladies learn the work the output will be still greater. In the finishing department and the trimming of the gramophones we find that their work is about equal with the men.

The rate of pay in this factory runs from $1 to $2.50 for female help per day. We find it very difficult to get the ladies to work on the woodworking machines. We have used them for helpers, but have not as yet felt it advisable to ask them to take charge of a machine, as the most of the woodworking machines require a little more strength and the work is rather heavy. There are many positions in the furniture factory that female help can be applied to which will assist greatly in the production, as the introduction of the latest type of machinery leaves but a small amount of work for the assemblers. We have several ladies in our plant who are becoming very efficient in the assembling of the different lines.—Gold Medal Furniture Manufacturing Company, Uxbridge, Ont.

* * *

No. 11.—We have always employed women in our mattress department for making cases. During the past eight months we have employed about twelve

women in our woodworking factory at Uxbridge, and if we could get them, we would double this number. With a few exceptions, they are giving good service. The exceptions with women are not any greater than with the men. We get plenty of men on who are absolutely useless. The help problem can be solved to a large extent by employing female help.—Gold Medal Furniture Manufacturing Company, Ltd., Toronto, Ont.

* * *

No. 12.—We have only recently decided to employ girls in our factory. At present we are trying them at varnishing, but as they have only been at it for a week it is hard to say if they will prove satisfactory. Our finishing foreman, however, is of the opinion that, given time, there is no reason why they should not be able to manage this line of work as well as the men.—Wunder Furniture Manufacturing Company, Ltd., Kitchener, Ont.

* * *

No. 13.—The only female labor that we employ is in the office and cutting department, and you will see that these departments are entirely separate from the usual course of furniture construction. Therefore, we are not in a position to give you any information whatever along these lines.—The Schierholtz Furniture Company, Ltd., New Hamburg, Ont.

* * *

No. 14.—At the present time we are employing two women in our factory, and we have found them entirely satisfactory in every way. The work that they are doing is what we call assembling stock. The wood that they are working on is beech, and as this is fairly hard wood to nail together, we were at first just a little afraid that they would not be able to make a success of it, but they are putting the stock together just as well as any man.

This is the only work that we have had them at, and at the present time we are paying them $9 per week. This work we were formerly paying for as piecework; but, of course, we do not expect women to put it together as quickly as men, but at the rate that we are paying them they are making practically as much as if the work were being done by male labor on piecework. As this has been only an experiment with us we are more than pleased with the results that we are getting, and expect to put more on later on.—The Stratford Manufacturing Company, Ltd., Stratford, Ont.

* * *

No. 15.—We have not employed any female labor, although there are many branches of our work in which female labor could be employed very profitably, but we would have to rearrange some of the sanitary arrangements in our factory, with proper retiring and dressing-rooms for the women.

We anticipate trying the experiment in certain branches in our business presently, and when we have tried it out we will write you further in regard to the matter. We understand that quite a number of furniture factories are employing women in their finishing rooms, and we would like to have them give their experiences in handling female help where men largely predominate.—The Goderich Organ Company, Ltd., Goderich, Ont.

* * *

No. 16.—The only female labor that we employ is in the paper and printing departments. We have not been able to create a change of putting on female labor in the other departments; furthermore, there is not the female help to be obtained throughout this section.—The Office Specialty Manufacturing Company, Ltd., Newmarket, Ont.

* * *

No. 17.—We have employed women and girls in what might be termed the lighter branches of the trade, but where continuous and sustained labor is concerned they cannot produce and keep up with man labor, for the reason that the average woman has not the physical strength. There are, of course, light jobs where dexterity of arm or hand movements are concerned at which they can compete.

Generally speaking, however, give us men for the average factory work. Occasionally a girl of robust constitution will be found to take a man's job and earn a man's wage, but on an equal piecework price they will earn $10 per week against $18 or $20 for a man.

In clerical or general office work they are quite as reliable and capable as men, but, of course, cannot as a rule move up to administrative positions on account of the fact that they will get married and quit their jobs—and who would be mean enough to say ought of them for that?

Our impression is that factory work in normal times done by men should, after the war, be done by men, and women should be employed only in lighter pursuits, such as operators of sewing machines, knitting machines, and similar pursuits compatible to their temperament and physiques.—Imperial Rattan Company, Ltd., Stratford, Ont.

* * *

No. 18.—We are employing sewing girls only, as we have not found it necessary to use female labor in our other departments up to the present. Therefore, we cannot give you any information in this.—The Ellis Furniture Company, Ingersoll, Ont.

* * *

No. 19.—We have not resorted to employ females in connection with our factory. We question very much whether the result would be in any way satisfactory, as the furniture business does not readily lend itself to the employment of females, although there may be a limited number of females employed in some factories. So far, as stated, we have not been obliged, nor seen the wisdom of doing so.—The D. Hibner Furniture Company, Ltd., Kitchener, Ont.

Increased Consumption of Oak

Mr. J. T. Kendall, secretary of the American Oak Manufacturers' Association, Memphis, Tenn., advises us in a letter under date of October 9 that his association has just completed a careful comparison of oak stocks as of January 1 to September 1, which shows that shipments of oak have exceeded the production considerably.

Mr. Kendall says that, in the opinion of the association, this condition will last indefinitely, due to the fact that large quantities of oak are being used in government orders of all kinds, and that the demand for oak is improving right along. As an illustration of the increase in demand, Mr. Kendall states that in one mail the association received over thirty-five enquiries for oak from furniture manufacturers alone, and that these enquiries came from all parts of the country.

Modern Methods of Paying Employees

Piecework System Would be Satisfactory for Furniture Factory if Rates Properly Fixed—Premium and Bonus Plans Outlined

By J. K Thomas

Fundamentally there are only two ways of paying men for their services—that is, there are only two elementary principles of wage payment. One is day wages and the other is piece rates. Under day wages a man is paid according to the time he spends, regardless of the quantity of work he does in that time. Under piece rates a man is paid according to the quantity of work he does, regardless of the time he spends doing that work.

Most of the furniture factories with which I am familiar are on a piecework basis. Piece rates can be applied very well in factories manufacturing large numbers of standardized parts. The work of furniture factories is thoroughly standardized, and consequently the piece rate system is very easily applied. Each worker is usually engaged in turning out some small parts or in doing some specific work in relation to the given parts.

Although the piece rate system is apparently best for this line of industry, I think much could be done to improve the methods by which the rates are determined. It is probable that many of these piece rates are simply determined by figuring a fair average from a number of men all doing the same kind of work. Sometimes the previous records are drawn upon to determine a normal day's work for a given line of work.

In one plant that I am acquainted with a great deal of dissatisfaction and unpleasantness arose over the establishing of piece rates. When the men approached the foreman with a request to readjust the prices, he said he could do nothing as the superintendent had fixed the rates. He apparently thought the men would be afraid to go after the superintendent. Such was not the case, however, and when the superintendent was interviewed, he referred the men back to the foreman, saying it was he (the foreman) who had fixed the rates. Thus cornered, the foreman admitted he had fixed them, and when the men demanded to know what basis he had used in fixing the prices, he stated that he had been guided by the prices paid in the plant in which he had formerly been engagd. The result was the men made it so absolutely unpleasant for him that he was obliged to leave, and is now working on the bench himself.

Establishing Piecework Rates

In this case the foreman was not entirely to blame. He was made the "goat" by those higher up. The foreman probably did the best he knew how under the circumstances.

No foreman should be allowed to fix piecework rates. That job is worthy of the attention of the best man in the organization, and should not be attempted without being gone into in a thoroughly fair manner.

It will be obvious that it is quite impossible to fix a rate that will be entirely permanent. For example, a new belting system may accelerate the speed of all the machines in a given shop. This change may enable the workers in a factory to turn out 20 per cent. more work during the course of a day. But the increased production is not due so much to the increased efforts on the part of the worker as it is due to the capital expenditure of the employer.

If it is found advisable to deliver all supplies to the workers where they work, this will give the individual worker at his machine more time in which to turn out parts. This saving in time is due, however, to the increased service of the storeroom. The employer must foot the bill of this increased cost of delivery. It is not logical that the employer should foot the bill and the employee should get all the benefit of the new arrangement.

Changes and adjustments of this kind are always likely to affect the conditions under which the work is performed. It is almost impossible to standardize a rate for all time. One of the chief faults of the piece-rate system is that it does not easily adapt itself to changes such as those indicated. There is always likely to be some friction when a change in rates is made.

Objections to Piecework

An objection to the piece rate from the standpoint of the employee is that it puts all the uncertainties and conditions of material, of expense, of delays (often delays for which the man is not responsible), upon the workman. And, beyond this again, when output has been largely increased and earnings per day have risen correspondingly, employers have rarely been able to resist the temptation to cut the piece rates, with the result of endless dissatisfaction and resentment among the men.

The inherent and almost fatal difficulty of the system is that of fixing piece rates which are fair to both sides and which both sides still continue to think fair after practical experience with them. The usual, or at least the frequent result, therefore, is an artificial limitation of output determined by the men. The employer gains somewhat greater certainty as to the amount of product his employees will turn out—somewhat greater certainty, that is, than under day wages—but he also usually reaches the irritating certainty that his output is far less than it might be. It is far less because the men dare not make it greater for fear of another cut in rates. The man of extraordinary efficiency again finds himself held down to the average. The conditions again become permanently unsatisfactory.

To evade these evils, three advance wage systems have been devised. All three accept as a basis to start from the proposition that standard day wages shall be paid as a minimum. Under each and all of these systems every man receives at least his ruling wage as long as he is employed, no matter how much his output may fall below expectations or hopes. It is in the reward for more than average production that the three systems differ.

The Premium System

The premium system is characterized by the desire to disturb shop conditions as little as possible. Times of operations are fixed by averaging old records, or are fixed very nearly at the average of old records, and any time saved by a man on any operation is divided between him and the shop. He is credited with his proportion (generally either 30 per cent. or 50 per cent. of the time he saves), and at the end of the week, or of the wage period, whatever it may be, his premium earn-

ings are calculated and the total paid over to him, often in a separate envelope.

The difficulty is that as the standard times are not scientifically set they are often enormously bettered (that is, shortened) by the men; the premiums become very large, and there is the old piece rate temptation to the employer to cut prices—or, in this case, to set new and much shorter standard times, and when this is done the whole scheme is discredited.

The Bonus Plan

The bonus plan seeks similar results (a division of the time saved) by a different policy. The originator of this plan, unlike the sponsor of the premium plan, is so desirous to make large output possible that he would turn the plant upside down, if necessary, to remove causes of inefficiency. Each job is analyzed scientifically, and the best way of doing it in the minimum time determined. A workman is not allowed to try to earn a bonus until he has been instructed how to do the job properly. No bonus is given until the very large gain necessary to reach the task limit set has been made. Then a big bonus—25 to 50 per cent.—is given all at once.

This system makes the conditions favorable for large production and for securing great gains in earnings for the employee. It intentionally sets the task limit or bonus mark so high that the men cannot exceed it so much or increase their earnings so much as to tempt the employer to cut prices. But it has the disadvantage of requiring rather special ability on the part of the employee.

The other system, known as the efficiency system, is a combination of the bonus and premium systems.

To sum up: It is next to impossible to recommend any particular system for any particular plant. The conditions existing at each must be carefully weighed and a plan adopted that will give satisfaction to both parties and secure the interest and co-operation of the employees.

How to Increase Cabinet Room Efficiency

Suggestions from a "Man in the Shop"—Would Have Manufacturers Furnish Mechanic's Tools—Says Much of Time Now Wasted Could be Saved Under This Plan

By "Mechanic"

If furniture manufacturers will consider a suggestion from "the man in the shop" as to how they can—in part, at least—cope with the present scarcity of skilled mechanics and incidentally increase the efficiency of their factory, they may find something in this article worthy of their attention.

A great deal has been written from time to time about placing the machine room on an efficient basis,

Tool cabinets as an aid to efficiency.

but very little has been said about the cabinet room and trimming department, or what might be called the hand-tools departments. True, some suggestions have been advanced regarding bonus systems and premium plans of payment, but, in the opinion of the writer, one of the best bets has been overlooked.

I will start by asking a question. Why should a cabinet maker or trimmer be obliged to buy and maintain anywhere from $25 to $150 worth of tools to do the company's work with, any more than the machine man should be forced to purchase his own planer or sander

Here, then are the suggestions: Erect tool rooms in some convenient part of your cabinet and trimming rooms and fit them up with neat and tidy cabinets, similar to that shown in the accompanying illustration. Have an emery wheel in the tool room, and give one of your good, old, reliable mechanics the job of looking after the tools, keeping them sharp and in good condition.

When purchasing the tool equipment do not do so haphazard. Give the matter some study and choose the tools best suited to the work to be done. Get an assortment that will be sufficient to cover all the demands of the department. Have enough of each kind, so that one workman does not have to wait until another is finished in order to get a tool.

Clamps and hand-screws are two items that the employer should be liberal with. Get clamps of different lengths, so that the men do not have to waste time trying to put two of them together to reach the distance. When possible have clamping devices that will do away with the necessity of using hand-clamps that have to be adjusted.

In the matter of hand-screws it is advisable to do away with these wherever possible. They are time-consumers, and can very often be dispensed with if the superintendent or foreman will use a little ingenuity and figure out some device to use in their place. This can often be done where there is a lot of the same kind of work. There are always some jobs, however, for which hand-screws are necessary, and it is a good plan to have plenty of them.

With a cabinet room organized on this basis a much greater output should be possible than one where each mechanic is obliged to provide his own tools and keep them in shape. Under the old method a man will get along without a certain tool for a long time rather than spend the money on it. He cannot be blamed, because the price of a tool is often a big consideration to a man loaded down with domestic obligations, such as making payments on a home, etc.

The manufacturer may force the men to buy the lat-

est labor-saving tools by putting them on piecework, but the question is, "Does it pay them to do so" By supplying the tools themselves, manufacturers can use some discrimination and get the tools best suited to the work in their shop, whereas the men buy according to their own judgment and taste. Most of the tools are standard, of course, but with chisels, screw-drivers, bits, saws, etc., there is room for choice. Hand-saws are not used extensively in furniture factories nowadays, but where they are used it is worth something to have them all kept in shape by a competent mechanic.

In a cabinet room arranged along the lines suggested it might be a good idea to keep each bench equipped with a couple of chisels and one or two more of the tools most in use. Then when the bench-hand is given a job by the foreman, the tools necessary, such as spiral screw-drivers, braces and bits, and whatever others are required, should accompany the job. On the completion of the job they should be returned to the tool room. All tools on the benches should be handed in at night and newly-sharpened ones placed on the benches in the morning.

Considerable time is wasted by workmen when they have to walk, sometimes the entire length of the shop, to the emery wheel and then perhaps wait until some person else is finished. This time is saved under the tool room plan, and the tools are kept in better condition. It is surprising what poor mechanics some men are when it comes to grinding tools; a great deal of time and steel is wasted. It might, of course, be necessary for each bench-hand to touch up plane irons and chisels occasionally on an oil-stone. An oil-stone could, therefore, be provided as part of the equipment of each bench. By changing these around it might be possible to keep them from getting holes gouged in the centre by mechanics who insist on rubbing their tools on one spot.

The writer is strongly of the opinion that, if necessary, female labor could be utilized extensively in furniture factories in both the trimming and cabinet rooms if all operations were standardized and the proper tools provided for each operation. A competent foreman could allot the work and give instructions where necessary.

Types of Ripping and Jointing Machines

A Practical Discussion on Their Application to Furniture Factory Work—Will Make Perfect Joints for Core Stock—Buzz Planers Should Have Round Heads

By James Clarke

Self feed or power feed rip saws began to make their appearance in the furniture business about twenty years ago, superseding the rip saw that had a portion of its table mounted on a track and rollers, and which had done good service for a considerable period.

The common type of self feed saw is a glutton for work and the amount of stuff that can be put through such a machine by intelligent operation makes the old type a back number. Care is required on the part of the operator, however, in order to avoid wasting material. This waste is more likely to occur in the ripping of stock that may not be as straight on the edges as is required for the jointer. If the piece is not held true for the feed spur to engage it, a slanting slice is taken off, and the piece carried through at whatever angle it has been held to the feed mechanism.

The self feed circular rip saw is such a well known tool that any detailed description is not called for. The various kinds of feed and the speeds of same, etc., are matters for individual preference. The writer is rather inclined towards the endless underfeed method. One reason for this is that it is sometimes desirable to rip stock on the power feed saw that may have been planed to a finished thickness, and in some cases even sanded. In such a case the feed marks of the spur feed would not be removed by the saw kerf unless a thinner spur feed was used. These remarks are made from experience and there is no bias in connection with them.

Some types of self feed saws have the saw on top of the table and the advantage claimed is that the saw goes through the minimum amount of wood. This sounds like a reasonable argument. There is also an apparent advantage in the exhaust piping of such a machine. These points are worthy of consideration by intending purchasers.

It is quite possible on some kinds of ripping to keep three hands busily engaged, the one feeding, one bearing away and the third pushing back the "leftovers" to No. 1, so that the saw is continually buried in the wood.

Many rip saws can be utilized for jointers as well. The core stock for veneer work can be jointed perfectly straight and smooth from a self feed saw and makes a big saving in labor and material by using a smooth cutting saw. The cores go straight to the glue clamp and as they are usually made from 1-inch lumber there is plenty of thickness for the subsequent planing before veneering. There was a time when a great deal of jointing was done by saws and for the flat square joint they are not excelled by the best buzz planer.

The band rip saw is also used in some plants in connection with the first ripping operations. These machines are alright in factories that have sufficient machinery equipment to keep a real good saw expert at work. The principal advantage of the band rip saw is less waste in the saw kerf. The speed is as fast as the men can stand it, and then some, which is also true of the circular saw.

Jointers

From the old and time tried buzz planer to the Linderman jointer is a considerable distance in machine achievement. It is further back than most of us can remember, when the first buzz planer made its initial bow, "guaranteed to make the edge of any board perfectly straight," and also to top off any too inquisitive fingers with charming unconcern. The buzz planer is still one of the necessary machine tools of the factory equipment but it is used for other purposes much more extensively than for making glue joints. In some plants where special ordered work is made the buzzer still makes glue joints and makes them well.

The machine should be equipped with the modern

round head which has thin steel knives inserted that stick out very little beyond the head. This makes possible a very close throat and reduces the danger of serious accident to almost an impossibility. The adoption of round heads for buzz planers should be made compulsory.

The endless feed jointer is now the prime favorite for jointing operations. It has a large capacity for work, is easily kept in order and turns out perfect work. A good type of cutting heads are the ones having inserted bits, as these can be replaced when worn out. A mechanical grinder is necessary for the accurate grinding of the cutter as it ensures the cutting of each bit.

A first class jointing outfit for the majority of furniture factories is a good endless feed jointer having the V-cutting heads, an extra pair of heads with square bits for jointing stock that has to be resawn and a revolving Billstrom glue clamp carrier. With such an equipment the glue jointing part of the manufacturing is well taken care of and can be recommended with confidence.

The Linderman glue jointer is of more recent development, at least in its perfected completeness. It has been refined by its manufacturers. The work that this machine can turn out places it in the front rank. To be able to glue and joint lumber without the use of clamps and to rip the parts to a width and pile them on trucks ready for the next operation makes the old timers rub their eyes.

Some claim to have trouble with dovetail joints showing a thin thread-like line along the joints of case tops weeks after they have been jointed. The same trouble has been known to occur with other methods of jointing as well. Who has not experienced the same thing with built-up veneer work? The trouble is in the material used. When a machine makes a perfect joint and good glue has been used, so that the joints were practically invisible, even under a magnifying glass, and then after the varnish has been applied trouble appears, it surely is an injustice to blame the glue jointing machine. The trouble is elsewhere, and it must be carefully gone into to locate the source.

Choice of a glue jointing outfit is one for every individual manufacturer to settle for himself, but wise men keep an open mind and are guided by the experience of others coupled with their own. The needs of every kind of wood working factory can be filled by the fine equipment of present day machinery manufacturers.

A Furniture Factory in Quebec

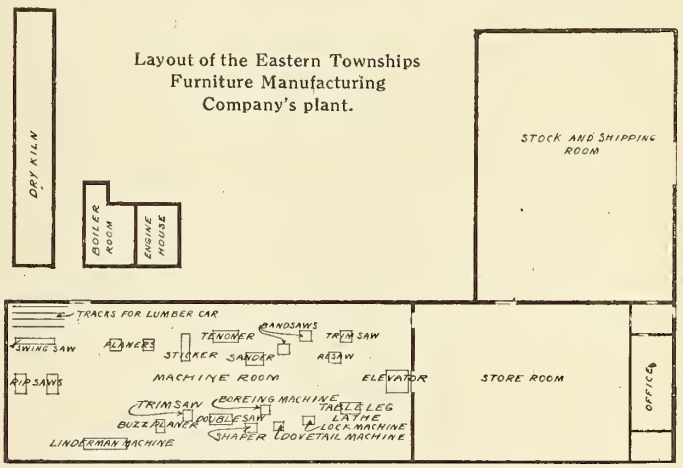
The household furniture made by the Eastern Townships Furniture Manufacturing Company, Arthabaska, P.Q., is mostly in the cheaper grades. The lines are extensive and varied. The manufacturing is done in a two-storey factory of L-shape, the main building being 250 feet by 60 feet, the L portion 100 feet by 75 feet, and the kiln 107 feet by 16 feet. The building is of metal-clad construction, very substantially built, and with abundance of light. The company was organized in 1904, and operations commenced in January, 1906.

Birch is the principal wood used. This material is purchased locally, piled for several months, and afterwards kiln-dried. Between one and two million feet is kept in stock. The kiln has a capacity of between 4,000 and 5,000 feet per day. Tracks from the kiln to the machine room permit the lumber trucks to be run almost up to the cross cut and rip saws. A Linderman machine does the jointing and glueing, after which the other processes of planing, tenoning, edging, sanding, shaping, etc., are attended to. The narrow stuff goes to the sticker, where four sides are dressed in one operation.

All goods are of the printed type, imitation oak and mahogany being the finishes preferred. The table legs are stained. After being varnished the stock is conveyed to the assembling room, and so to the storeroom. The glass is packed and shipped according to the orders received. The glass is put in the shipping room and then the furniture is packed and shipped according to the orders received. All goods are of stock patterns, and are manufactured in such quantities as to be available for prompt shipment.

All the work is routed through the factory by means of tags, bearing the manufacturing order number, number of pieces, material, finished size, article, and catalogue number. A tag is made out for each description of piece required. The foreman of the assembly room is also supplied with a job list, so that he is informed of the nature of the goods required.

The labor cost is kept track of by means of time sheets, which specify the time of each man on every job. This is totalled up and the wages credited to each



Layout of the Eastern Townships Furniture Manufacturing Company's plant.

man, together with the aggregate labor cost. The cost of lumber, hardware, etc., and overhead—the latter on a fixed percentage basis—is added, and in this way the total cost of a given job is ascertained.

Most of the machinery was supplied by McGregor, Gourlay & Co., the Berlin Machine Works, the Wood Turning Machine Company, Beloit, Wis., and the Canadian Linderman Company.

Mr. H. A. Simpson, the manager, was formerly of Kitchener, Ont., and has been all his business life in the furniture trade. The president is Mr. H. Pepin, the vice-president Mr. J E. Perrault, M.P.P., and the secretary Mr. C. R. Garneau.

"The Pursuit of Safety"

The Automatic Sprinkler Company of America, with offices at 123 William Street, New York, N.Y., have issued an attractive book bearing the above title. The book, which is effectively illustrated, discusses in detail the subject of fires, their origin, so-called fireproof construction, and the effective protection against fires which can be obtained by having a building equipped with automatic sprinklers. The book points out that insurance is no protection as the manufacturer is not usually compensated for his full loss by the amount of insurance he collects.

Belt-Slip on Woodworking Machines

Some Remarks Regarding Choice of Pulleys—Tendency is to Use Small Ones When Larger Ones Would Give Better Results—Determining Percentage of Belt-slip

By N. G. Near

It is not uncommon for pulleys on motors used for driving woodworking machinery to be too small. I don't know why they are allowed by the manufacturer to be so small unless it might be for the fact that a larger pulley would look ungainly. Say what you will, much of our present-day machinery is designed from the standpoint of "looks" rather than from the standpoint of science and utility. Small pulleys look better on a motor. They look as though they won't consume so much power and as though the work they have to perform is a simple matter.

However, small pulleys are great power-wasters, and, for that reason, should be avoided wherever possible. There is no good reason why a 12-inch pulley should not be used in place of a 6-inch pulley so long as the belt speed will not be excessive. Speeds up to a mile a minute are generally pretty safe and economical.

This doubling in size of pulleys can be done by simply doubling the size of the driven pulley at the same time. As a result the width of the connecting belt may be cut in half. The friction loss in the journals will be less because the belt pull and initial tension are less. The first cost of the pulleys, of course, will be greater, but that is usually more than compensated for by the decreased cost of the belt. And last, but not least, an enormous amount of power is saved year in and year out because of the prevention of belt-slip.

The writer has demonstrated to the satisfaction of a number of engineers that each per cent. of slip in a main drive belt represents a loss of 1 per cent. of the power delivered to the motor if the woodworking shop is driven by a motor.

Roughly, this theory may be explained in this way: If we assume that the belt-slip is so excessive that it becomes 100 per cent. it means that the driven machine or pulley is not running at all. The motor is doing just as much work as when it is pulling full load, because the belt tensions are the same, and, mathematically, we must therefore assume that the friction is the same. Friction is required in order to permit a belt to drive any pulley.

Therefore, with 100 per cent. slip we have a concomitant 100 per cent. power loss. Again, if the slip is zero we know the power loss due to belt-slip must be zero also. If the belt-slip is 50 per cent. the power loss is 50 per cent., for it is certainly in direct proportion to the slip. Based on this logic, therefore, we can conclude that each per cent. of slip means a power loss of 1 per cent. Thus if your woodworking plant is being driven by a 100 horse-power motor and if the main belt slips 5 per cent. there is a loss of 5 horse-power, of which at least 3 horse-power could be saved.

There should never be more than 2 per cent. slip in any belt fully loaded. This is a slip that cannot be averted, because it is due to the elasticity of the belt, and is properly called "creep." It is a simple matter to prove mathematically that any elastic belt, such as leather, rubber, cotton, etc., will creep at least 1.5 per cent. or more. A steel belt, of course, will creep very little, because steel is much less elastic than the common materials, but even with steel there is bound to be some creep, which can be computed to a nicety based upon the coefficient of elasticity of steel.

To determine the percentage of belt-slip is not as difficult a problem as is generally thought. I have often seen directions something like: "Measure the diameter of the driven pulley; then the diameter of the driving pulley; then the thickness of the belt; then count the r.p.m. of the driving pulley; then the r.p.m. of the driven pulley, etc." You can beat that all hollow in this way:

Count the r.p.m. of the driven pulley when the belt is pulling full load. Then count the r.p.m. of the same pulley when it is pulling no load at all. Subtract the former from the latter and divide by the latter. Then multiply by 100. The answer is the percentage of slip.

It is assumed, of course, that the motor or engine will not slow down as soon as a load is applied. If the driving pulley slows down at all the rule doesn't hold, but inasmuch as most modern engines and motors are of such type that the speed is a constant quantity, whether loaded or not, this rule is a good one.

For example, if a given driven pulley runs at a speed of 378 r.p.m. when the belt is transmitting full load, and if the same pulley runs at a speed of 396 r.p.m. when the belt is transmitting no load at all, the difference is (396-378) 18 r.p.m. Now, dividing 18 by 396, we get 0.0455 as the quotient. Multiplying by 100, we now get 4.55 per cent. for an answer as the percentage of slip of the belt.

If there are several countershafts between the main motor from which power is obtained and the driven machine, as is often the case, this same rule may be applied in determining the total percentage of slip between the driven and driving pulleys. It is not necessary to measure the intervening pulley diameters at all nor pay any attention to belt thicknesses.

Of course, in running slip tests of this kind judgment must always be used. When running the belt at no load the belt should be transmitting no power at all. It is impossible, to be sure, to drive any pulley without the requirement of power, even if equipped with the most sensitive ball bearings obtainable. But this point of frictionlessness is so closely approached in most modern drives when all power is thrown off of the driven machine that we can usually call it a "no-load transmission." Some drives may be of such a nature that this test cannot be adopted, especially those having no friction clutch connections.

One point worthy of emphasis before closing is that the revolutions per minute must be determined as accurately as possible in order that the slip measurement may be accurate. Even a variation of a single revolution will make a difference in the answer, so if you are five, six, or ten revolutions "off" in your counting of a slow-speed pulley you can't expect a very accurate answer.

The writer has had experience with students who have erred to such an extent in taking readings of this kind that they found the driven pulley to run "faster" than it possibly could under any practical or theoretical condition. Don't fall into this self-same error.

Market Conditions of Gum Lumber

In a communication to the "Canadian Woodworker," dated October 9th, Mr. J. M. Pritchard, Secretary of the Gum Lumber Manufacturers' Association, Memphis, Tenn., describes market conditions as affecting gum lumber as follows: "On account of an anticipated serious car shortage, September 1st, 1917, consumers of lumber generally made it a point to provide themselves with a sufficient quantity of lumber prior to that date for taking care of their needs for the balance of this year. Car shortage during July, August and September was not as serious as had been expected, due to the fact that there was a better distribution of cars by the railroads and greater efficiency in loading and movement. Business, therefore, for the first nine months of this year was on a 'boom' basis which has caused the stocks at the mills to be rather badly broken.

"Just at the present time the demand is not quite so brisk, due, of course, as stated above, to the fact that the consumers are already well supplied with lumber for temporary use. Unusual demands, however, are developing every day for lumber, on account of the enormous requirements of the government in its preparations for war, and this is keeping the mills busy, and on the whole we expect a splendid market for many months to come.

"To give you some idea of the enormous demand for gum lumber, our records show that on September 1, 1916, our members had on hand unsold 73,972,316 feet of gum lumber. On September 1, 1917, these same mills had on hand 77,040,580 feet, an increase of only 3,068,264 during the period when business was "booming" and there was every inducement to increase production."

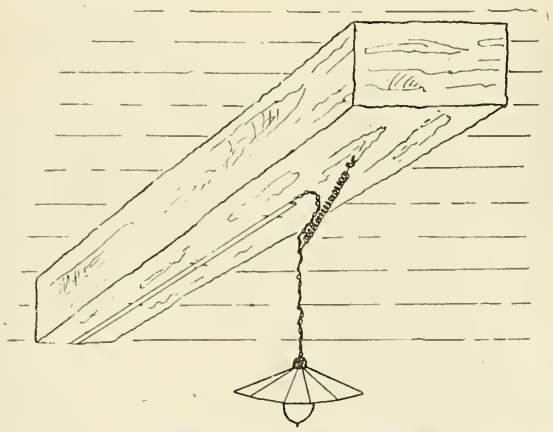
Speaking further of the consumption of gum lumber, Mr. Pritchard states that the Association records show that practically all of the furniture factories in the United States are using gumwood. He says there is an increased quantity of gum being finished natural and that large quantities are used in the manufacture of what is termed compound furniture, that is, furniture finished in mahogany and walnut in which the solid parts are made up of gumwood, it having been found that there is no better wood than gum for taking a mahogany and walnut finish. Mr. Pritchard also says that the records of the Association show that the shipments of gum lumber to Canada are increasing at a nice rate and that most satisfactory business relations are being established between the members of the Association and Canadian furniture manufacturers.

Alcohol from Wood Not Injurious

There is no reason for discriminating against ethyl alcohol made from wood in favor of that from grain or molasses, according to the Government chemists of the United States Forest Products Laboratory at Madison, Wis. The impurities in commercial ethyl alcohol, they say, are small in amount and probably less objectionable when wood is used as a base than when grain or molasses is used. The prejudice against the use for some purposes of ethyl alcohol made from wood is probably accounted for, the experts say, by a confusion with methyl, or "wood," alcohol, which is poisonous. While both products are derived from wood, they are radically different. The ethyl, or grain alcohol is made by reducing the wood to sawdust, treating the sawdust with an acid to produce chemical sugars, and converting the fermentable sugars into alcohol by fermentation, as in the case of grain or molasses. Wood alcohol, however, is obtained by condensing certain gases that are liberated when the wood is heated in airtight retorts, so that it decomposes without burning. Ethyl alcohol has, it is stated, been commercially manufactured from wood for several years in this country. It is suitable for any use to which ethyl alcohol from any other base is put. Improvements on the processes which have been developed at the Forest Products Laboratory have made it possible to decrease the former cost of production.

To Prevent Bulbs Breaking

In factories where heavy machinery causes floors to vibrate a great deal of trouble is experienced through the breaking of the filaments of electric light bulbs. A method of overcoming this to some extent is to attach a short spring from the ceiling to the cord of the light,



Spring absorbs shocks due to vibrations.

as shown in the accompanying sketch. The spring absorbs the shock and is well worth trying where the expense of replacing broken bulbs is heavy.

Death of Prominent Lumberman

We regret to announce the death of Mr. T. Smith Milton, of the Churchill Milton Lumber Company, of Louisville, Ky. Death was due to a complication of typhoid and malaria, taken while on a trip to the company's southern mills at Greenwood, Miss., and Glendora, Miss. Mr. Milton fought off the illness and completed his work before coming back to Louisville, but when he came back he was forced to retire at once, and a week later was taken to the infirmary, where he died in a few days.

Mr. Milton was one of the best-known lumbermen in the southern States. He was a member of the Gum Lumber Manufacturers' Association, the American Oak Manufacturers' Association, the National Hardwood Lumber Association and the National Wholesale Lumber Dealers' Association. He was also the first chairman of the Southern Hardwood Traffic Association, and the establishing of the Louisville branch of this association was due to his individual efforts.

The funeral was attended by the Louisville Hardwood Club in a body, Mr. Milton having been president of the club. Many floral tributes were sent by the various associations and resolutions adopted expressing regret at the passing of this prominent lumberman.

Illumination, Safety and Efficiency

Inspector of Industrial Accident Prevention Association Points Out Advantages of "Overhead Lighting" Over "Spot Lighting"

By F. G. Lovett

Manufacturers and employers in general are realizing more and more fully the importance of the accident prevention campaign that has recently been inaugurated in this country and the prominent part that the Industrial Accident Prevention Association is taking in this campaign is well known.

The present article, dealing with illumination in furniture factories, takes up a number of important points that have hitherto received little or no attention in books and periodicals, and it is hoped that the suggestions that it contains will be found to be useful and effective in promoting safety and efficiency.

Illumination is, perhaps, one of the last things an

Overhead lighting—Note symmetrical arrangement of units and uniform lighting effect

inexperienced person would think of as having a close and intimate bearing upon the prevention of industrial accidents, yet the study of this subject is extremely important, especially insofar as it relates to the intensity and distribution of artificial light, and neglect of it has been responsible for many serious accidents. In many of the older manufacturing plants it is quite evident that light was one of the last things considered, whether the natural or the artificial. There is a window about every eight or ten feet, about 3 feet by 6 feet in size, whereas a modern plant of to-day is mostly all glass. Why? Because manufacturers are beginning to realize that light means production, and production profits and safety.

But it is with the artificial illumination that we wish to deal. In using the artificial we are trying to compensate ourselves for the loss of the natural, and, in doing so, we should try to, as nearly as possible, equal, if not surpass, in efficiency the daylight of which we have for the time being been deprived. There are two systems of artificial lighting in use to-day. The first is what is known as individual or, more properly, spot lighting. The other, and by far the best, is the general, or overhead, system.

The former consists, in most cases, of a small lamp, usually a 16-candle-power, with carbon filament, hanging directly over the machine or bench and on a level with the line of vision of the workman. In some few cases reflectors have been provided; and, while these do good, in that they protect the workman's eyes from the direct glare of the lamp, they only increase the spot lighting effect. The employee's eyes **must** be protected from over-strain, else his efficiency decreases, also his production. While the individual light, with a good reflector, may concentrate the light upon the work or machine, all other parts of the department are in semi-darkness, which is very unsatisfactory, because when a workman is required to step out of the circle of light to get tools or material, the sudden change causes the pupil of the eye to expand quickly that he may see in the semi-darkness, and the pupil must contract as rapidly when he turns again to the light.

This continual expanding and contracting of the pupil will cause weak eyes, to say nothing of lost time and lessened efficiency. Other bad features of the individual light is that those whose duties require them to move about the room are continually in danger of low belts or shafting, tripping over stock and other obstacles on the floor. The foreman is handicapped, in that he must get close up to a machine or bench to find out if the man is working or idle. The laggard is always glad when the lights are turned on, for then he can always find a dark corner to hide in. These are only a few of the bad features of spot lighting.

But with the general, or overhead, system all these bad features disappear. There is no glare in the employee's eyes, and no shadows are cast to obtain this condition. Lamps should be hung about twelve or fourteen feet from the floor, thus bringing them above the line of vision. They should be at least 80 or 100-watt lamps, equipped with good reflectors. The duty of the reflector is to reduce the glare and also to direct the rays of light where they will do the most good. Hence, while reflectors or shades may at first seem to reduce the amount of light in the upper part of the room, their use actually increases the amount of light in a downward, useful direction, and improves the "seeing," due to the better conditions which surround the eyes of the workers.

These lamps should be set close enough so that the light rays from one blend with those around it, so

Note even distribution of light on bench to left, and freedom from glare throughout

that no matter on which side of his machine or work the employee stands there is no shadow from his body; he cannot stand in his own light; there are no shadows of moving belts, and the operator can adjust his machine without having someone hold a light. Truckers and sweepers, "of which there are too few," can do their work just as well as in daylight. With a system of this kind the foreman can stand at the end of a 100-foot room and see if each workman is in his place. Also, you have the same production as under natural light.

There is one thing that should always be remembered. That is that dark surfaces do not reflect light. On the contrary, they absorb it. How often you will find a lamp at a band saw or shaper hung so low that it bothers the operator's eyes. He protects his eyes from the glare by putting a piece of brown paper around it, in the form of a reflector. This does away with the glare, but it also absorbs about 40 per cent. of the light, so that, if it were a 60-watt lamp, he is only getting about 35 watts. The same holds good in regard to walls and ceiling. These should be painted or tinted white or cream color. They then act as reflectors and help to make the room bright and cheerful. The same holds good with machines; some plants have these painted cream also.

Quite a number of manufacturers are still using the old carbon filament lamp of 16 candle-power, because they are cheaper. These take from 50 to 60 watts. Compare their lighting power with a 40-watt tungsten lamp, and which is the cheapest? Bad lighting may permanently injure the workman's eyesight; it lessens efficiency and reduces production, which means reduced profits; and, what is worse, it increases the accident hazard. Good light means sufficient light, well distributed, and without glare. **Let there be light.**

Automatic Starters for Induction Motors

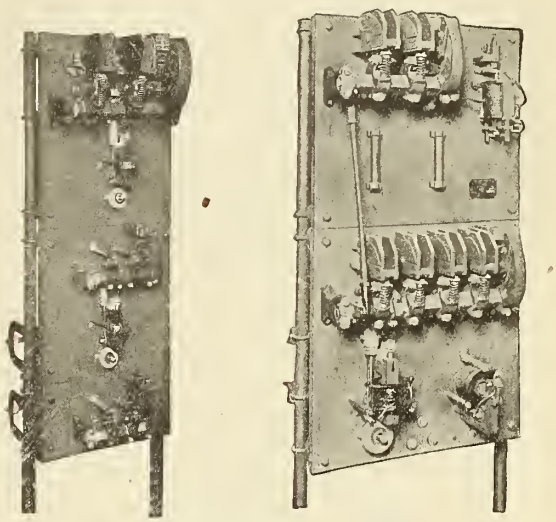
Two of the automatic starters and controllers for motor-driven machinery made by the Westinghouse Electric and Manufacturing Company are shown here. Describing these starters the company say:

"These automatic starters are for use with single-phase or polyphase squirrel cage and wound-rotor induction motors, where it is desired to start the motor from a remote point, or where automatic acceleration is required to guard against improper starting by unskilled operators. The starters consist of a magnetic contactor panel, which is the vital element, and a master switch, which may be either a push-button, a float-switch, a pressure-regulator, or similar device for closing the control circuit, depending upon the service.

"The contactors used on these starters are of a type which has been used by the Westinghouse Company with marked success in steel mill, cement plant, and mine installations where the requirements are extremely severe. The contactors are opened by strong spring action, assisted by gravity. The destructive action of the arc is reduced to a minimum by strong blowout coils and arcing horns.

"When starting motors driving line shafting, woodworking and machine tools, and similar apparatus, a small knife or snap-switch is closed. The starter then automatically makes the proper connections to limit the starting current to a suitable value and to vary the time required for acceleration according to the load on the motor, thus preventing damage to the machinery by too slow or too rapid acceleration, and saving time by bringing the motor to full speed at the most rapid permissible rate. When used for pump or compressor service in connection with a float switch or pressure gauge the action of the starters is entirely automatic, the motors being started when the pressure or liquid level of the tank controlled falls to a predetermined point and stopped when the desired maximum pressure or level is reached or vice versa.

"The automatic starters for squirrel cage motors are most frequently employed for starting motors operating centrifugal pumps, air compressors, fans, blowers, metal-working and woodworking machines, and other apparatus requiring starting torque less than full load torque. Squirrel cage motors of 5 horse-power and smaller are usually connected direct to the line. Large squirrel cage motors are first impressed with



Two types of automatic starters

low voltage from auto transformers or connected to the line through resistance, so that in either case the starting current is reduced. When the speed of the motor has reached such a point that the starting current has decreased sufficiently the motor is then automatically connected to the line.

"When an automatic starter is used in connection with a wound rotor motor the line switch is first closed, with the maximum resistance in the rotor circuit. When the speed falls to a predetermined value a relay closes a magnetic contactor, which cuts out a part of the resistance in the rotor circuit. Each contactor operates in a similar manner, cutting out its portion of the resistance at the proper time until all the resistance is short-circuited by the last contactor.

"The power on any circuit may fail suddenly. It is, therefore, important that some protection be afforded both operator and motor against an unforeseen return of power. This protection may be provided for motors operating pumps, compressors, etc., by a low-voltage release to disconnect the motor from the line when the voltage is low or power fails entirely. Then, as soon as power returns, the motor will automatically start up again. In many applications, however, such as for motors operating machine tools or woodworking machines, low voltage protection is required. Motors so protected are disconnected from the line when power fails, and will not start when power comes on again until the operator presses a button or manipulates a similar device. Hence there is no danger from the unexpected starting of a machine."

Upholstering and Trimming

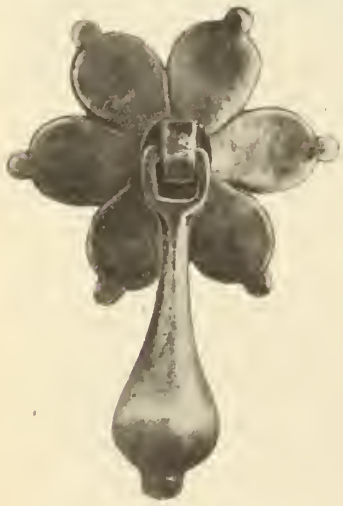
Recent Designs in Furniture Trimmings

By H. A. Palmer, designer with Foster, Merriam & Company

A few hints to the managers and superintendents of furniture factories regarding the selections of modern furniture metal trimmings might not be amiss. We will, for example, consider the dominating styles of the present time. These are unquestionably the William and Mary and the Queen Anne periods.

The metal trimmings in general used during the fourteen years of the William and Mary reign were knobs, pear-drop handles, and drops of slightly different patterns, bails with plain or chased plates. Cherubs' heads and other elaborations were modeled on escutcheons and key-plates. The more ornate trimmings were used during the early part of the period, with a gradual transition later to the plainer effects. The ornate mounts, used during a part of the William and Mary period, went out of style during the Queen Anne period, and were replaced by plainer brasswork. Handles were usually of the bail pattern, and escutcheons were sometimes plain, some pierced, and some highly chased.

The furniture of modern design and construction, in the various styles, has been brought up to date by many refinements developed from time to time, all with a marked tendency towards simplicity, in accordance with the demands of later day ideas. It would seem to be in better form to consider in the selections of metal trimmings for your furniture that which is unmistakably characteristic of the period in outline and principal features, but somewhat plain in appearance, thus embodying the design features with the plainer surfaces.



William and Mary pull.

Whether it should be the pear-drop, bail handle or knob, this combination, with its strong tendency towards simplicity, will lend an added richness in general appearance. Many of the originals in these periods were trimmed with brass in the Willow pattern. The flat backs were ornamented with scrolls, chased in by hand, these scrolls being of very irregular outlines. The backs themselves were cast from more or less crude patterns, and were not always exactly symmetrical. This lack of symmetry in the outline of the back itself and in the chasing helped to soften the general appearance of the trimmings, and made them blend in with the general outline of the furniture.

The modern tendency is to have each piece absolutely identical with each other piece. This is, of course, one of the results of modern manufacturing and of the competition in not only the furniture business, but in the manufacture of handles. It is possible, however, in many cases, if the furniture manufacturer so desires, to have a more artistic treatment of the metal

Drawer pull for Queen Anne design.

trimmings, and to effect in more or less degree a departure from the too exact duplication of outline and detail. In many cases some slight departure from exact symmetry would increase the antique effect not only of the mounts, but also of the furniture itself.

It does not seem necessary to-day to follow the old idea of chasing the backs. The artistic, irregular effect can be obtained by departing in the outline slightly from the regular form and by having the bails hang at slightly different angles. It is also quite essential for the trimmings to be correctly finished. It would be entirely wrong to consider for a moment the highly buffed surfaces. Such a contrast with the present popular dull or waxed finishes of the furniture would suggest the approach of a police officer with his two rows of polished brass buttons on his uniform.

On the contrary, metal finishes should be dull and antique, giving the appearance of many years of usage, exposure to the elements, and the rubbing from cleaning. Trimmings that are finished in the genuine old English antique certainly harmonize with the dull and subdued finishes of your modern furniture. The general effect obtained by using brasses of slightly irregular outline and antique finish is to increase the impression of use. The impression is one of the reasons back of the attractions which so many people find in the genuine antique furniture, and which, if it is coupled with the attractiveness of well-made, well-designed modern furniture makes the strong selling point.

The decorator must not be regarded as something outside of our actual life. He is a tremendous influence for good or bad. "Music hath charms," we are told, "to soothe the savage beast"—and decoration is the "music" of color and form.

Settee and Chesterfield Frames

FRAMES for settees and chesterfields are generally made, in order to give added strength, with one or more wood stretchers in the seat, according to length. While these add rigidity and durability to the frame, they frequently cause the upholsterer some difficulty for one or more of the following reasons:

1. The settee may require a low spring, with sufficient resistance to avoid the rail causing discomfort to the person sitting on the settee or chesterfield when finished.

2. A wood rail placed too high creates doubt in the upholsterer's mind as to whether the webs should be strained over or underneath it.

3. The position of the wood rail renders it difficult to arrange the springs, and may cause an inconvenient gap, liable to weaken the seat. The enthusiastic critic, anxious to test the workmanship of a settee seat, who bounces up and down on it is apt to be painfully aware of a wooden centre rail, and, in use, the owner of such a settee, knowing its defect, will be prompted to request a visitor to avoid sitting in the centre.

Sufficient reasons have already been given to show that wooden stretcher rails are not always to be recommended, and it is at least an open question whether the old-fashioned iron stretcher (Fig. 1) is not preferable to the wood stretcher mostly used in modern stuffover frames (Figs. 2 and 3).

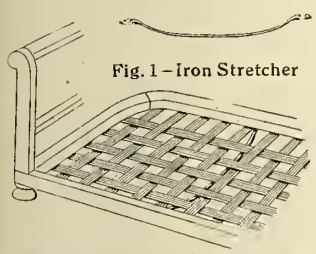


Fig. 1—Iron Stretcher

Fig. 2—Frame with iron stretcher.

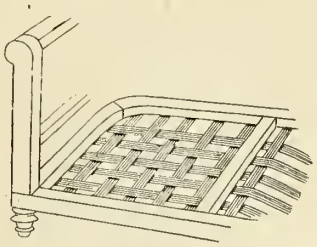


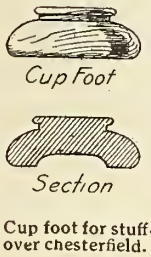
Fig. 3— With wooden cross stretcher

The use of an iron stretcher is recommended for strengthening the frame of a loose cushion settee because the upholstering of the seat of such a settee must be kept low, necessitating the use of a small spring without much resistance. By the placing of the stretcher below the web free play for the springs is obtained without the risk of discomfort when the seat slackens—a risk that it would be difficult to avoid if a wooden rail were used.

It will be seen from the foregoing remarks that wood stretchers on settee frames may be used with safety where a deep seat is required, but iron stretchers may be recommended with confidence for small settees and loose cushion work. Not only is the possibility of the rail being uncomfortably felt avoided by the use of the iron stretcher, but more freedom is allowed the upholsterer in placing the springs. There is another disadvantage in connection with the use of a wood rail which should be mentioned. In inexpensive work the upholsterer, to save material, is tempted to fix both web and springs to it. This will produce a firm and level upholstered seat for a while, until the webs slacken on either side of the rail and the seat then sags at the ends, while the centre, on account of the rail to which the springs are fixed, remains firm and rigid. This is sometimes the cause of upholstered settees becoming irregular and unsightly.

Spring Frame Stuffovers

A stuffover chair frame may be adapted or turned into a spring chair frame by removing the legs. A second frame of exactly the same dimensions as the chair seat is prepared and used as a base (see sketch, Fig. 4). Chairs of this type are comfortable when upholstered, but there is always a tendency for chairs constructed in this way to appear "out of true," the reason being that the springs tend to weaken on the side mostly used, which creates a noticeable tilt difficult to remedy. Such frames are made like ordinary stuffovers, but it is important that the base frame should be of exactly the same size as the chair seat, otherwise it is difficult for the upholsterer to produce a good effect. A square frame, as sketched, is better adapted for a spring frame stuffover than a shaped one.



Cup foot for stuffover chesterfield.

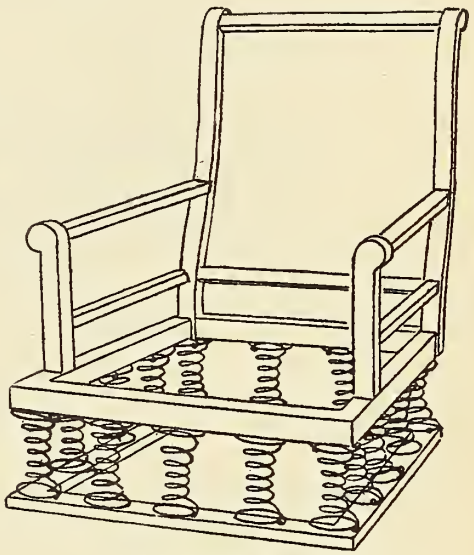
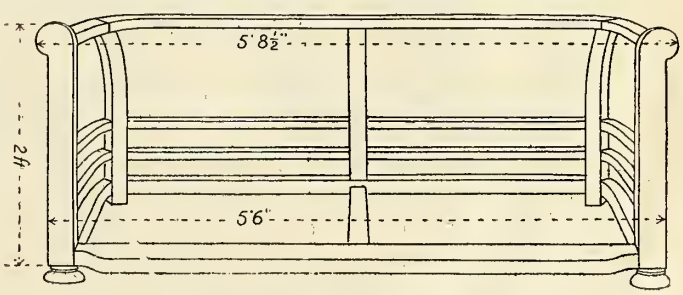


Fig. 4—Spring frame chair.

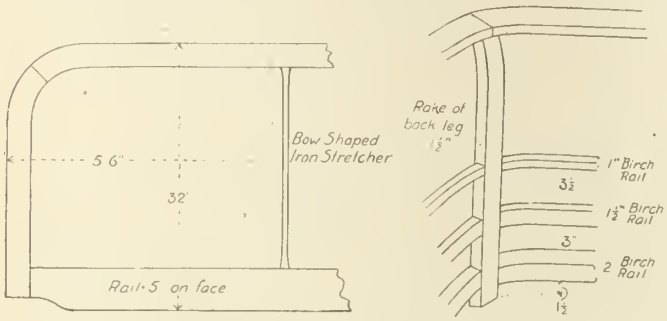
The real or genuine double-sprung seated chesterfield frame—a new departure in upholsterv—was much in demand before the war. It is proposed to describe these frames in detail, and it should be pointed out that the upholstering of such pieces should only be undertaken by skilled workmen. The writer has often seen settees with luxuriously soft seats, for which long prices have been paid, returned as unsatisfactory, the faults having been caused by the incorrect position of the rails, which results in the materials being either over-strained or under-strained.

The double-sprung, or deep-seated, chesterfield frame should be constructed differently to the ordinary spring-edge frame to allow for the deeper seat. This is effected by lowering the base of the frame to within three or four inches of the floor. An additional stuff-



Construction of chesterfield frame

ing-rail is required, to which the coverings are fixed, instead of to the base frame. This rail should be of stout wood, at least 1½ in. birch. As a rule, such rails are not made strong enough for heavy tacking. The position of the rail is also very important. It should be neither too high nor too low, as otherwise the buoyancy of the seat is affected. If in the former position,



Plan and details of chesterfield frame

there is too little resistance and the seat binds; in the latter position there is too much resistance, and the springs are liable to shift their position at the surface, whilst the base remains rigid.

Reason for Using a Tough Wood

The many tackings necessary to secure the various materials used, some of which must be affixed to the extreme edges of the frame, make it necessary to use a tough wood, which will not split easily, for it is obvious that any weakening of the hold of the tacks, especially those which secure the webbing and spring covering, is inimical to proper workmanship.

Formerly upholstery frames were made of beech, with mortised joints, pinned and closely braced. At present, birch is the recognized wood for good-class work. This timber takes stain well, and no difficulty is experienced in the polishing shop in finishing the legs or cup-feet either oak, mahogany, walnut, or satinwood color.

The dowel-joint is the one now most generally employed in framemaking. In larger frames, such as chesterfields, settees, and divans, four dowels should be used to each joint, but for slighter frames three will suffice, although the base should always have four if the wood is strong enough to take this number.

Cup feet are generally used for double-spring frames, and flat, well-proportioned cups are superior to those which are round or half-round in shape. These cups may be dowelled on after the frame is made, but the best method, and that which gives the neatest finish, as far as the upholsterer is concerned, is to fix the cups with screws after the work is fully upholstered. Care should be taken by the upholsterer that the wood is kept clear of tackings at the angle of the frame on the underside, to allow for glueing as well as screwing on of the cup. As already pointed out in previous chapters, iron stretchers fixed underneath the base of the frame are preferable to wood when a low edge is required for loose cushions. A real double-sprung seat constitutes the last word in comfort, but unless the frame of a double-sprung chesterfield is correctly made, the work will soon become unsightly—The Cabinet Maker.

Period Designs in Furniture Trimmings

The trend of demand for furniture has been increasingly toward period styles, and during the past few years manufacturers have about run the gamut from Adam to William and Mary.

Hardware manufacturers have kept well abreast of the changing tide, and some have anticipated the next move by bringing out new modifications in design of period trimmings. Through the courtesy of the Burns & Bassick Company, Bridgeport, Conn., U.S.A., we are able to show some new designs, one in particular a very recent Queen Anne pull.

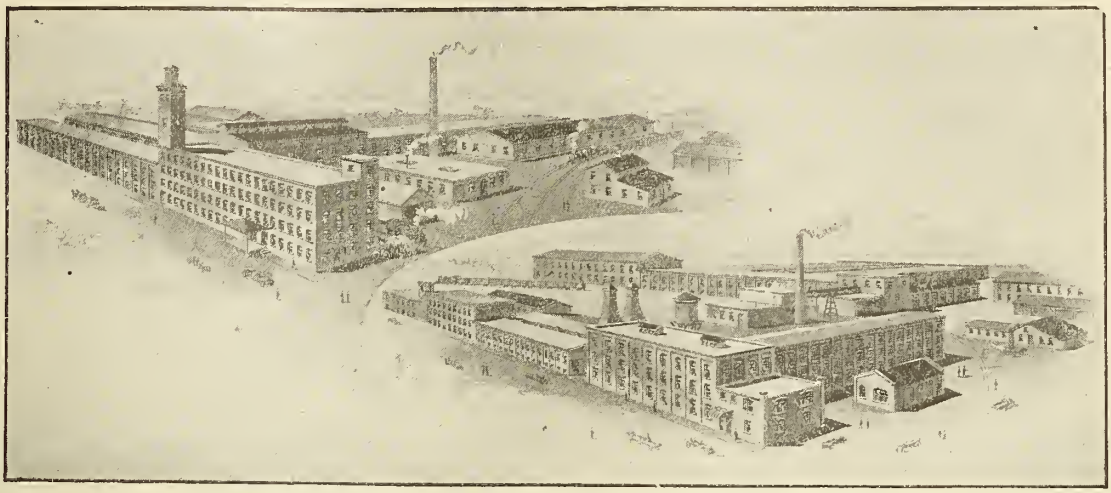
Queen Anne furniture has been, and is to-day, one of the popular period styles. Other popular designs are Chippendale and Louis XIV., also shown herewith. These designs are among the latest produced. There are designs in trimmings extending from the very simple to the more ornate, and, of course, in the Louis we find the most extreme fancy designs.

Louis style.

Queen Anne.

Chippendale.

Some New Designs in Period Trimmings.



Plant of the Eagle-Ottawa Leather Company at Grand Haven, Michigan

Increased Use of Split Leather

The growth in the demand for leather for upholstering dining-room chairs and living-room furniture during the past few years is one of the features of the tanning industry. The Eagle-Ottawa Leather Company, of Grand Haven, Mich., who are large tanners of enamel leather for automobile and furniture manufacturers, state that the development of new finishes, especially on split leather, has helped to widen the demand. They say that ten years ago very few manufacturers would have thought of using split leather on dining-room chairs, but on account of the high price of grain leather, tanners went to work to develop a finish for split leather that would prove both artistic and durable, and their efforts have met with success.

The Eagle-Ottawa Leather Company is in the front rank of those that are bringing out new lines. They have two modern plants—one at Whitehall, Mich., and the other at Grand Haven, Mich.—where they manufacture an immense variety of leather for almost every conceivable purpose. The growth of their business has been phenomenal, and the reason assigned therefor is their favorable location for manufacturing.

The Eagle-Ottawa Leather Company issue a very attractive sample book of their product for furniture leather consumers, which should prove of value if filed in your purchasing department.

Choosing Casters for Your Line

By C. B. N.

Casters, though seemingly a very small part of furniture, require consideration, for if the proper kinds and finishes are not used with the different styles of furniture a great many sales may be lost, whereas the manufacturer, by the exercise of a little thought, could raise his particular line to a higher standard.

Put good casters under your furniture—something that will assist in moving it easily. That's why you use casters. If you use poor casters the furniture does not move easily. In that case you had best do without casters and use the money for a better varnish. This fault of using poor casters is frequently found among furniture manufacturers.

Your desire is to move furniture easily. Therefore, one essential thing is a large wheel in the caster. If a small wheel is used under heavy furniture there is a greater risk of tearing carpets and marring floors.

Other important items are the finish of the caster and the kind of wheels to be used. You would not think of making a table with a pine top and mahogany legs. The same applies to casters; the wheels should be equal in quality with the rest of the furniture. For instance, if you make furniture of quartered oak with golden finish, do not use a maple wheel caster. This might do, but a brass-plated caster with a lignum vitae wheel would send it off on the "high-class road."

For dark woods an oxidized or gun-metal finish caster would present the best appearance. Almost any finish can be found, and it is better to secure samples and put them on different pieces of furniture to see exactly how they look. This will also give an opportunity to make a test to find out how they carry the required load, etc. Do not sacrifice the appearance and easy movement of your furniture for a few cents' difference per set in the price of casters. Whenever you do this you detract from the quality of your furniture. If a good caster is used you have made better furniture. You have uniform quality throughout. You have pleased your customers. They can display the goods more advantageously. The result is more sales. Better goods bring more returns.

Sixty-Eight Years in Business

Noblit Brothers & Co., of Philadelphia, Pa., U.S.A., jobbers of cabinet hardware and upholsterers' supplies, have seen the light and joined the columns of our advertisers. This firm was established in 1849, and has continued in business at the same address to the present time. This record says more for the honesty and efficiency of the firm than any verbal eulogy that might be composed in their praise. Their territory includes nearly every state east of the Mississippi River, from Canada to Louisiana. The management is progressive, and its ideals are thoroughly in sympathy with the highest aims of the furniture manufacturers. The "Canadian Woodworker" wishes them the continued success that their long and honorable service deserves.

"Safety First" Department

Rip Saw Accidents and Their Prevention

The following paper on rip saw accidents and their prevention was read by F. G. Lovett, inspector for the Industrial Accident Prevention Association, at a convention of the National Safety Conucil hed in New York from September 11 to 14:

There are three types of injuries that the operator of a rip saw is apt to meet with, if proper protection is not provided. The most common of these are to the hands, and more particularly to the thumbs and fingers. The next is to the eyes, and the third is to the body and intestines.

The causes of hand injuries are in the most part due to carelessness, or, what I believe would be more correct, absent-mindedness on the part of the operator, who, to use a Biblical expression, "having eyes, see not," because their mind is not on their work. An operator, in passing work over a saw, will use his thumb more than any other part of this hand to press the material forward, and, if he is not careful, will push it right into the saw, or it may be one of the fingers—more usually the index finger. The injuries also result from the operator trying to remove edgings or slivers which become lodged in the saw groove or throat of table while the saw is in motion, with the result that the hand is jerked suddenly into the saw. Reaching over the saw to pick up stock, or failing to use a push-stick in ripping narrow stock. These are the most common causes of hand injuries.

And, while these accidents are serious enough, those to the eyes are much more so. These wonderful windows of the soul, through which we look upon the beauties and wonders of earth. When the blinds of these windows are closed and the soul looks out upon the blackness of eternal night; when the faces of those we love are but a memory—this, I say, is more awful than the loss of fingers or even a hand. And this is the result of one of the accidents that happen to rip saw operators, caused by flying knots or fragments of wood striking them in the eyes.

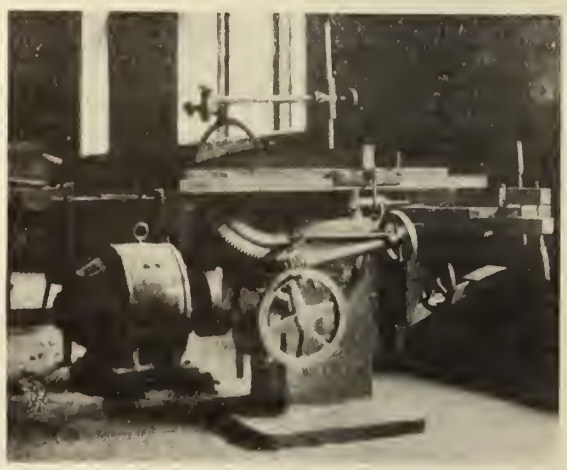
Another type of injury that is most terrible in its effect is that caused by "kick-backs," when a piece of board is thrown forcibly back by the revolving saw, striking the man in the abdomen and causing internal, as well as external, injuries, and, as I said before, often proving fatal. There are several conditions that may cause a kick-back. Lack of a proper spreader, or, if the spreader is too thin it will not do its work efficiently; or it may be that the saw has not enough set, which will cause it to bind in the stock. The use of too small a saw, or not setting it high enough through the table—these conditions are the main causes of kick-backs. These are the types of injuries and the conditions under which they are most frequently met.

But, while it is comparatively easy to find the cause of the trouble, it is not so easy to eliminate it. Will a mechanical guard prevent the hand injuries? In many cases, yes; but carefulness and thoughtfulness on the part of the operator are the main factors. No matter what style of guard is used, it must be raised to allow material to pass under; and, if the operator is using his thumb, which is a common practice, it will follow right under the guard, unless he is watchful to keep it out of the line of cut. I think you will find more rip saw operators with the end of their thumb cut off than the operators of any other wood tool; so, while a guard is an absolute necessity, it is not the only requirement. A good guard and a careless operator are a poor combination.

What is the best type of guard is a broad question, as it depends a good deal on the class of work in hand. For ordinary rough ripping, where no edging is done, a guard may be used that covers the saw completely. But in the better grade of work, such as furniture, where the edge must be straightened before the piece is ripped to size, and where no edging table is provided, it is necessary for the operator to see the saw, that he may properly judge his cut, so that it is not possible to use a guard that totally covers the saw. No matter what the class of work or type of guard used, it is only by carefulness on the part of the operator that most of these accidents can be prevented.

It is in the prevention of eye injuries that the guard is a real factor, in stopping flying slivers or knots. I have had men tell me that they can dodge these. The soldier on the battlefield may as well claim to dodge the bullets. To prevent these accidents the guard need not completely cover the saw, but it should be set low enough and far enough forward so that the operator cannot see more than two inches of his saw.

To prevent kick-back the first requirement is a proper spreader. This should not be less than two



Adjustable saw-guard made by American Woodworking Machinery Co.—In use at technical school, Toronto, Ont.—Instructors there say it is a good practical guard.

inches in width and the same gauge as the saw, the set of the saw teeth giving clearance enough to prevent binding. It must be set in perfect alignment with the saw, and the front edge should be bevelled on both sides, so it will enter the kerf easily. This will prevent stock from binding on the saw. Too little set in the saw will also cause a kick-back, because the stock binds the saw. The setting and filing of the saw has a good deal to do with its safe working condition, but this would make a very interesting paper in itself, and I do not intend to discuss it here.

The use of too small a saw, or setting the saw so

that it just cuts through the stock are both bad practices and the cause of many kick-backs. Let us suppose that a man is ripping one-inch lumber with a ten-inch saw, set just high enough to cut through the board. Under these conditions the saw teeth strike the stock at such an angle that it has a tendency to drive it back, and if the saw be set up to a proper height, it will only be engaging one, or at the most, two teeth. The cut will be more squarely through the board, and the tendency will be to draw the board in rather than drive it back.

The condition and the position of the saw are two factors in safety work that receive altogether too little attention. This also applies to the gauge, or, as some term it, the fence. For an ordinary rip saw the gauge should not be more than two inches high. The high gauge does not leave room for the operator's hand, even with a push stick or narrow stock. It should extend at least six inches beyond the back of the saw, and should be in perfect alignment with it—if anything, a little slack at the back end—and thus prevent stock from binding on the inner side of the saw. If it is the reverse—that is, tight at the back—it means that when the stock reaches the returning saw teeth coming up through the table, they must cut themselves free, thus having a tendency to lift the board and throw it back at the operator, with probably serious results.

In a word, if we wish to eliminate the accidents on rip saws we must have four things:

An efficient spreader.
A substantial and serviceable guard.
A perfect gauge.
A careful workman.
And the greatest of these is the workman.

Prevent Stock Kicking Back

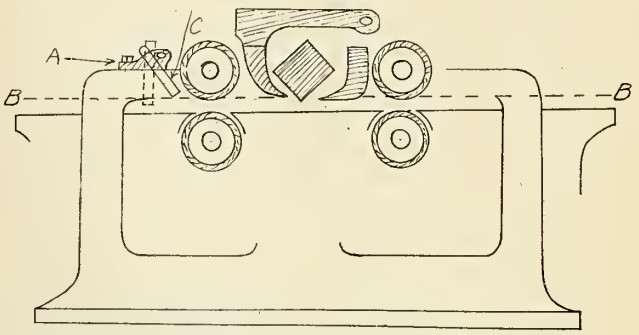
By S. E. Saunders

Someone has said that the only real and genuine safety appliance is a "careful man," but let us look or pass down through the machine room of any one of our factories to-day and how many of the "walking safety devices" do we find? Mighty few men do we find who do not carry their trade mark, and very likely they will tell you the accident could have been avoided.

As "necessity is the mother of invention," the writer has always believed that every accident might have been prevented. The cause can usually be found after we have been appalled by what has happened. A little more thought or care in some direction, just the exercising of a little more forethought on the part of everybody concerned and an accident would have been prevented.

Just a few days ago a man sitting on a box in front of a planer was suddenly reminded of his whereabouts when a piece came back and cut him badly on the left hip. An onlooker soon invented a guard to stop any further occurrence of such accidents. The writer is pleased to pass along the idea for the benefit of the readers of the "Canadian Woodworker." It consists of an iron bar supported on each end of a planer by brackets, of the same material, and firmly bolted to side frames of machine, as at A in the accompanying sketch.

Extended from these brackets across the front of the machine is a 5/8-inch cold rolled steel rod, the length varying according to width of planer. On this rod, at the ends, is hung iron lugs or dogs, 2 inches wide and ½ inch thick, which reach down just below cutting line as at BB. As stock is fed to machine these fingers lift, at C, allowing access to rollers, but in no case will this little invention allow stock to kick back, as it often does where a quantity of odd thicknesses are being worked. The guard should be hung as



Guard to protect planer operator.

near to the front feeding rolls as possible to allow the feeding of short stock.

Stand Back From The Fumes

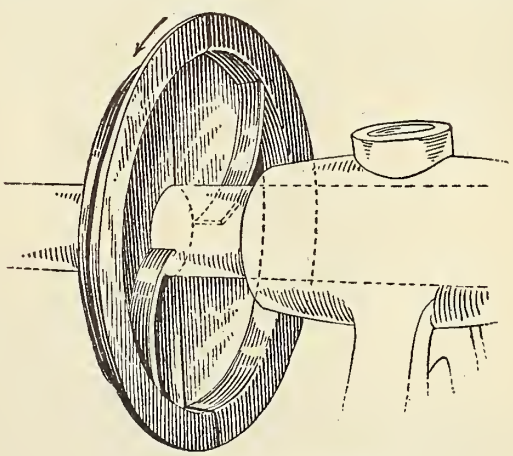
Recently while the writer was discussing the matter of "Spraying the Finish" with the foreman of a kitchen cabinet factory the latter stated that their finisher had encountered a slight difficulty in spraying the insides of the kitchen cabinets

The DeVilbiss Mfg. Company, of Toledo, Ohio, manufacturers of the Aeron System finishing machines, say that this difficulty can be overcome by placing the cabinets on a turn-table and keeping the cabinet between the operator and the Autocool fan in the fumexer. They also advise the operator to stand to the side of the work instead of directly in front of it, and state that in this manner he will avoid the rebound of the fumes.

In addition to these precautions they say that a higher air pressure should be used if possible, as this will reduce the amount of fumes.

Shaft Oil Shield

The accompanying illustration shows a method that can be used to prevent oil from creeping along a shaft



To keep oil off the shafting.

and getting upon belts and pulleys. The disk should be put facing the bearing, with the wings pointing in the direction the shaft is to revolve so that any creeping oil will be forced back.—"Power."

Sole Product is Table Slides

The two views shown here illustrate the plant of B. Walter & Co., Wabash, Ind., who are large exclusive manufacturers of table slides. This business was started in 1887, and the company state that during the thirty years of their manufacturing experience more than five million dining tables have been equipped with Wabash slides. A year's consumption of lumber and

Lumber yard at B. Walter & Company's plant

dimension stock at their plant amounts to between two million and three million feet, and the annual production is sufficient to equip approximately 400,000 tables, which the company say is more than one-third of the tables made each year.

The factory of B. Walter & Co. is one of interest. Many of the machines are of special design, combining quality work with large production. The lumber is unloaded by the use of a gravity carrier, is placed upon dry kiln trucks, and fed into six large modern dry kilns. The machinery—all electrically driven—is arranged for the progressive movement of the material through the plant. The automatic double cut-off saw sets the pace for the other machines, and maintains an average of 10,000 pieces over its saws each day.

Wabash slides are well known to the furniture trade, as they are used by some of the largest United States and Canadian table manufacturers. B. Walter & Co. take a pride in making their slides of uniform quality, and they advise us that it is a source of much satisfaction to them that complaints from the users of the Wabash slides are almost unknown. They say that this condition does not just happen, but is the result of painstaking effort and constant attention to details, the making of accurate table slides being a job for specialists.

Mr. Fred B. Walter, secretary and treasurer, and Leonard J. Fox, sales manager of this progressive concern, are well known among the Canadian table manufacturers, they being largely responsible for the generous volume of Wabash slides being used by the Canadian manufacturers.

The plant of B. Walter & Company at Wabash, Ind., where their well-known table slides are made

Cradles for Working Under Autos

The sketches shown here illustrate two types of cradles that are used for working under automobiles. These cradles are handled by some of the firms carrying automobile accessories, but it is the opinion of the writer that there would be an extensive sale for them if the business was handled properly. Every car owner is a prospective purchaser.

Some woodworking plant might be able to manufacture these articles and market them to advantage. They are quite simple to make. Fig. 1 consists of two cross-pieces, about 16 inches long, hollowed out to a depth of about ¾ inch. This is a straight band-sawing proposition. The length of the cradle is 36 inches. Either five or six slats can be used, depending on the

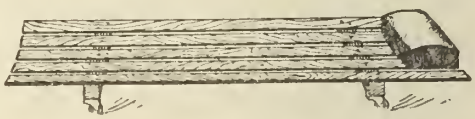


Fig. 1—For person to lie on while under car.

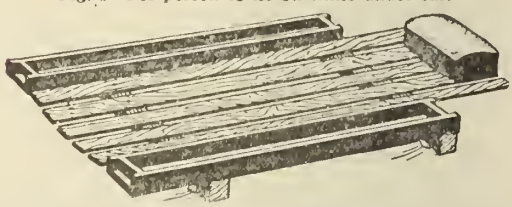


Fig. 2.—Same as Fig. 1 but equipped with tool rack.

width. All that remains, then, is the casters and the padded block for the person's head to rest on.

Fig. 2 is practically the same, except that boxes or racks are provided on each side for tools. Fig. 1 sells retail for $1.65 and Fig. 2 for $2.75.

Alcohol Made from Sawdust

The use of sawdust is very much cheaper than grain or molasses for the manufacture of alcohol, and does not involve the consumption of valuable raw material; so states an article which appears in a recent issue of "Conservation," the publication of the Commission of Conservation of Canada.

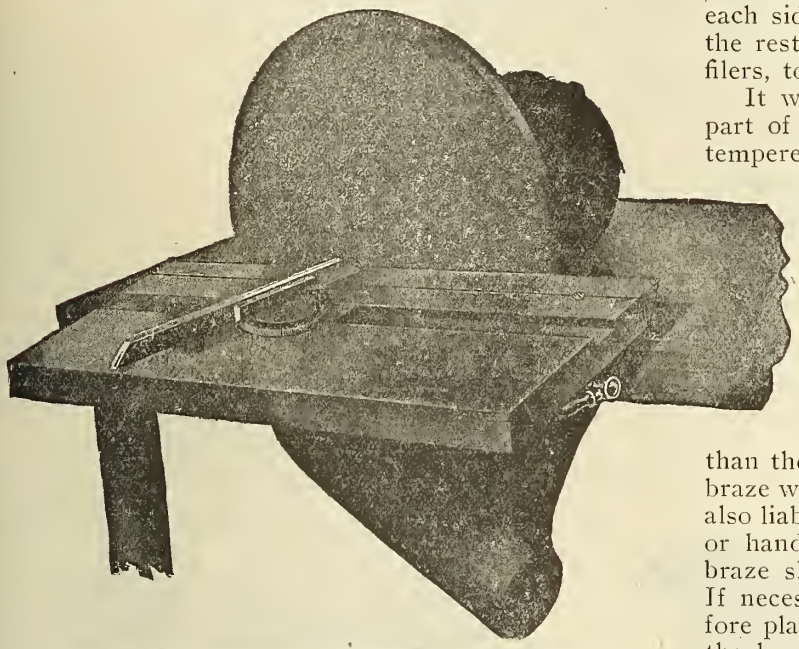
An instance is given of a North Carolina plant which produced in 1912, 310,000 imperial gallons of 95 per cent. alcohol from the equivalent of 35,000 cords of pine sawdust and waste. Since 1914 this plant is said to have increase its production.

The sawdust is "digested" with sulphuric acid; the soluble constituents are extracted with hot water and after neutralization with milk of lime and clarification are pumped into fermenting vats; yeast grown in the wood liquor is added and after fermentation, the fermented liquor is distilled.

New Electric Disc Sander

The new machine illustrated herewith, for which patents have been issued under date of August 8, 1917, is designed for use in pattern shops, to do a large part of the work now done on a jointer or trimmer. For speeding up work and reducing the cost of pattern-making it is said by the makers to be a valuable pattern shop accessory.

In pattern shops where these machines are in use



This tool is recommended by the builders for pattern shops

the plan adopted is to place one of them on an iron pedestal at the side of the bench for every pattern-maker, or, in a large shop, one for every two pattern-makers. It is claimed for this machine that where it is installed, one for every two pattern-makers, there will be an average saving of at least $10 per week in pattern costs.

The makers say that demonstrations in large shops have proved that much of the work heretofore done by slower processes can be accomplished on this new machine, and that two pattern-makers will keep a machine busy all day long.

Besides pattern shops the machine is in use in a number of manual training schools, these having taken it up because it just fits their requirements, being an up-to-date and efficient pattern-maker's disc sander, built on a small scale. The discs are of steel, 14 inches in diameter, with the abrasive material glued right on, furnishing a true and firm surface for doing accurate work. The discs can be quickly removed so that several discs carrying different grades of abrasive material can be kept ready for different kinds of work.

The table measures 8 inches by 21 inches and angles 45 degrees to or from the discs. Tables are fitted with removeable steel lips, slotted and provided with fence or duplicate gauge, which angles 45 degrees to right or left. Exhaust hood is included as standard equipment. The motor is a 1/3 h.p., ball bearing, totally enclosed type, which the makers say will operate either on alternating or direct current at a cost of from 2c to 4c per hour. It is furnished complete with cord plug and receptacle so that it can be operated from any light socket.

This machine is being placed on the market by J. A. Fay and Egan Company, 153-173 West Front Street, Cincinnati, Ohio, who will be glad to furnish bulletins and quotations on receipt of request.

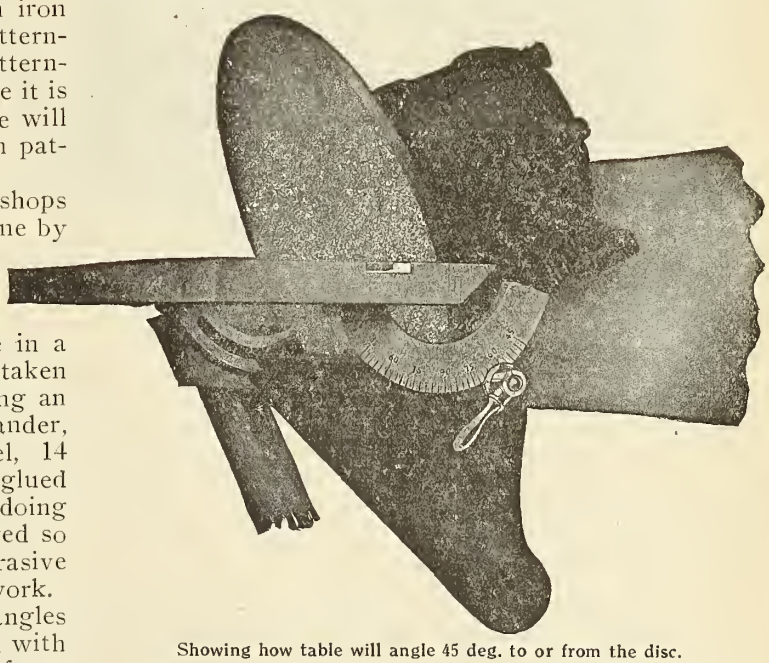
Watch the Braze

The braze is the weakest part of a band saw, and as such should be subjected to constant and close inspection. The reason why it is the weakest part of the saw is because the braze itself and about one inch each side of it is bound to be milder in temper than the rest of the saw—a quite common opinion among filers, to the contrary notwithstanding.

It would seem that a slight consideration on the part of those who contend that a braze can be fully tempered would suffice to dispel the impression, but it seems to persist. As the temperature necessary to prepare the braze for a high temper would melt the solder, it is obvious that only a comparatively mild temper can be secured.

The original temper of the saw is drawn by the hot irons in brazing. After this all that can be done is to finish the braze and then stiffen it, but it is impossible to secure the original high temper.

As the material right at the braze is milder than the rest of the saw, it naturally follows that the braze will pull tension quicker than any other part. It is also liable to bends when changing saws on the wheels or handling them in the filing room; therefore, the braze should be carefully examined after every run. If necessary, it should be levelled and tensioned before placing on the wheels again, otherwise a crack in the braze will quickly result. When this occurs the braze should be immediately re-made, as there is always much more danger attending a crack of this kind than one in the body of the saw.



Showing how table will angle 45 deg. to or from the disc.

Breakage at the braze will be practically eliminated if rigid inspection is made after each run and any indication of weakness or tension pulling corrected before it has a chance to develop.—Disston Crucible.

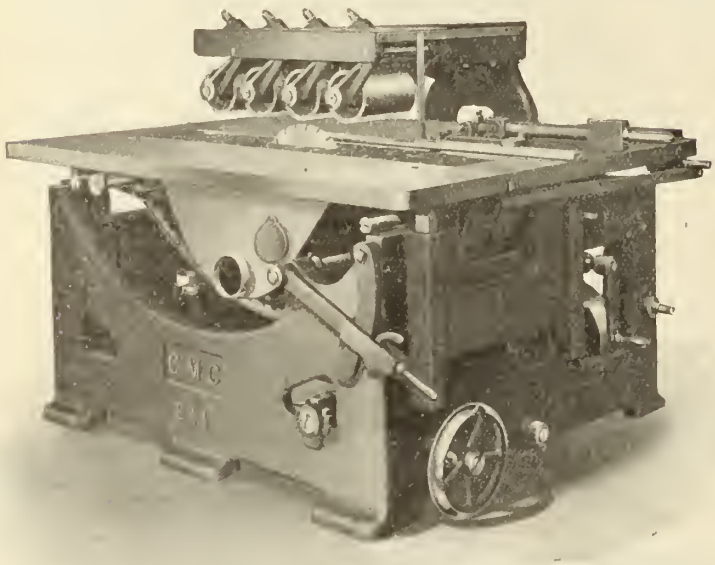
Oil may be regarded as the "life blood" of paint, for when it leaves the pigment the paint is a corpse!

No. 611 Straight Edging and Jointing Machine

The straight edging and jointing machine illustrated on this page is made by the Canada Machinery Corporation, Limited, Galt, Ont. It has been designed for work in furniture factories and woodworking plants. The machine is heavy and accurately built and the company state that when stock is ripped on it, the edges are sufficiently true to be glued together without further work. The result of this is a saving of material and also of the time which is usually required for the jointing operation.

The design of the feeding apparatus allows one piece to be fed immediately after another, so that the cutting of the saw is continuous. The company say that in the design of this machine the operator's safety has been a first consideration and that under no circumstances do the hands of the workman come in proximity to the saw blade and that it is impossible once the stock is engaged in the feed mechanism for it to be thrown back on the operator.

The saw is driven from below, and as a hood is provided to cover the under portion of the saw, the edgings and sawdust are carried away and the operator of the machine is not troubled by them. The saw will rip stock 29 inches wide and up to 3 inches thick with a 14-inch blade. The makers of the machine state that it can be operated successfully by the average unskilled workman.



Straight edging and jointing machine for woodworking plants

The feeding mechanism of the machine consists of two endless travelling chains, one on either side of the saw blade and four spring pressure rolls to hold the stock firmly against the chain. The chains consist of iron link blocks hinged together by iron steel pins. The blocks are corrugated on top to give them a grip on the stock and they run in metal troughs that are provided with liners to ensure perfect alignment and to take up weight.

Owing to the accuracy required the arbor is 1 15/16 inches diameter, supported in three stationary self-oiling babbitt lined bearings, and is provided with an adjustable end thrust. Seven inch collars are provided to stiffen the saw blade. The table is 5 feet 2 inches long, 3 feet 10 inches wide, and is divided into two parts, each part carrying one of the feed chains. The micrometer adjustment controls the chain projection above the table.

The pressure rolls are reinforced by coiled springs and the two centre rolls are recessed to receive the projecting saw blade. The fence is a self-locking type and the graduated scale on the front of the main bracket permits the operator to freely make adjustments up to 27½ inches. The rates of feed are 50, 75, 115 and 175 feet per minute. They are obtainable through a taper cone pulley arrangement which is operated by hand wheel on the front of the machine convenient to the operator.

This cone pulley eliminates the use of friction or changed gears and gives a positive feed which can be instantly disengaged by a handle controlling a gravity belt tightener on the initial feed drive. The standard equipment for this machine consists of one 14-inch planer tooth saw blade for fine jointing and one 14-inch rip saw blade, countershaft with fast and loose pulleys and necessary wrenches. The company state that a 14-inch saw projects 3 inches through the table at its lowest position, but that a 16-inch saw may be used if desired.

Piece of Simonds steel used for testing Russian bullets

Testing Russian Bullets

Our readers will no doubt be interested to learn how the ammunition which is being made in the United States for the allies is being tested. The Simonds Manufacturing Company, of Fitchburg, Mass., advise us that one of the methods in use by an eastern cartridge manufacturer is to place a piece of Simonds saw steel and, from a fixed distance, fire a hail of bullets at it from rifles and machine guns. The picture shown herewith depicts a piece of Simonds saw steel which had been subjected to a storm of 24,000 Russian bullets.

Women as Woodworkers

The following details of the operations performed by women in the various branches of the woodworking industry are taken from a pamphlet issued by the British Home Office and Board of Trade:

Saw Milling

Before the war women were not, save in extremely rare instances, employed in sawmills. They are now being successfully employed in the following work, where it is light:

Joinery Work.—Labelling wooden pegs for gardens, nailing iron bands to army bed planks, nailing together paving blocks and washing boards, rough, light work.

General Laboring.—Carrying, stacking, piling, and general transport of timber. Women deal with the lighter timber only.

Sawing.—Women do light work on small saws only.

Warehousing and Packing. — Women pack light articles.

Wood Machining.—Boring machines, feeding and taking off; compressing machines, as used in key and trenail departments of railway works, operating; gulleting (saw sharpening) machines, operating (machine set by the mechanic); planing and moulding machines, feeding and taking off (women plane and take off light articles only); sandpapering machines, operating (women deal with articles of moderate weight only).

Wood Turning. — Light articles—e.g., bobbins, brush and tool handles, etc.—turned by women.

Wood-Wool Manufacture

In general, the work in this industry is too heavy for women. It has, however, been found possible to substitute them for men in the following operations:

Feeding and tending wood-wool machines, except where heavy parts of the machine have to be moved by hand at each feeding operation. Women attend the lighter machines, and logs are specially cut for them to a lighter weight. Men set the machines.

General Laboring.—Transport of wood-wool about the works. Women of strong physique required.

Sawing. — Women do light work on small saws only.

Box and Packing Case Making

In this industry women are replacing men to a considerable extent in the following processes, with satisfactory results, and in increasing numbers:

Box and Packing Case Making.—Hand: Attaching iron bands and fittings, knotting and splicing rope handles, nailing, screwing, wiring, glueing, jointing, making-up. In the making-up of the heaviest type of cases two or more women replace a man.

General Laboring.—Carrying, stacking, and general transport of boxes and material. Heavy boxes and cases are carried and stacked by men.

Painting.—Painting, staining, and varnishing boxes and packing cases. Men needed for the heavier work.

Sawing.—Operating tubular saws.

Warehousing and Packing. — Lightweight articles only handled by women.

Wood Machining.—Feeding and taking-off from the following machines: Boring, drilling, branding, and printing, chipping (women corner boxes), dovetailing (women work the smaller machines), grooving and tonguing, hand-holing, jointing, planing (women corner boxes), matching and glueing, nailing, sandpapering, and buffing, wire bundling, wire stitching; taking off at circular saws, hand saws, four cutters, hand planing, and dovetail squeezing machines.

Furniture

In large works with a variety of special machine-tools there is greater scope for the employment of women than has hitherto been recognized by employers, especially in light repetition machine work. With suitable reorganization and separation, many processes now carried on by men could be added to those already performed by women. In bench work and other hand operations women are already employed on the lighter kinds of furniture in the processes named below. They are also largely engaged in French polishing all kinds of articles, although certain heavy pieces, such as sideboards, are still polished by men. If male laborers were in attendance to move such pieces, women could do the actual polishing. Women are being employed with considerable success in the following processes:

Cabinet Making.—Bench work (women plane light boards), caning, carving (hand and machine), cramping, dowelling, glueing, and cleaning-up of small articles in cheap cabinet trade, fitting-up and framing (women frame light articles), fretwork.

French Polishing.—Polishing cabinets and furniture (men required to move heavy pieces), polishing chairs.

General Laboring.—Women do cleaning up.

Upholstering.—Buttoning, drawing, filling, fixing webs and springs, seating pin-stuffed chairs.

Warehousing and Packing. — Women pack the lighter pieces of furniture. Men required to lift heavy weights.

Wood Machining.—Women are employed to sandpaper chair parts.

Wood Turning.—Women turn chair parts.

In a few of the processes enumerated above women cannot be utilized without some training, but in the greater number only a short training period is necessary. Tools and cutters are usually ground and set up for the women by skilled machinists, and in most factories these and other men over military age are available as teachers.

Importation of Furniture and Woodwork into Australia

A recent issue of the Canadian Department of Trade and Commerce Weekly Bulletin says:

"Excluding articles of wicker and bamboo, the total imports of furniture into Australia in recent years, together with the principal countries of origin, are given in the appended table:

	1913.	1914-15.	1915-16.
Value of furniture imports ...	£265,806	£143,502	£85,932
United Kingdom	£ 79,055	£ 40,912	£ 20,546
Canada	23,153	7,861	984
United States	106,275	75,352	52,928
Austria	28,254	5,920	816
Germany	9,845	2,397	....
Japan	10,040	5,645	6,617
France	2,015	657	732
Russia	2,130	1,712	1,132

"The decline in the importation of furniture, coincident with other lines of bulky goods, is attributable to the excessive ocean freights and other handling charges. In normal years the furniture imported included lines of household character, refrigerators, sanitary seats, chairs, office equipment, desks, tables, filing cabinets,

blind rollers, etc. Owing to the freight situation, many of these lines are now being manufactured locally.

"The importation in 1914 of a minimum customs duty of 4 shillings (97 cents) on each wood chair, or a net duty of 49½ per cent. (whichever rate returns the higher duty) has made the importation on low-priced Canadian chairs practically prohibitive.

"The manufacture of furniture from native and imported timber is an important Australian industry. In 1914 there were 502 factories, employing 6,956 operatives, which produced furniture to the value of £1,835,732.

Imports of Articles of Wood

	1914-15.	1915-16.
Articles of wood, n.e.i.	£111,011	£103,216
Barrels, casks, and vats, n.e.i.	8,781	1,682
Brush-makers' woodware	3,851	4,437
Buckets and tubs	219	111
Washing machines, wringers, mangles	20,187	16,424
Doors (including screen)	591	910
Tool handles (axe, etc.)	41,892	47,157
Elm hubs	5,346	3,304
Hubs, other prepared	....	31
Last blocks, rough	3,394	2,224
Lasts and trees	1,617	1,050
Oars and sculls	3,598	2,811
Pictures, etc., mouldings	13,559	14,262
Hickory felloes, rough	9,031	4,237
Rims, n.e.i.	11	....
Hickory spokes, dressed	12,011	7,002
Hickory spokes, rought turned	175	....
Shafts, poles, and bars	3,527	2,049
Shooks	4,371	1,346
Timber, bent and cut to shape	2,622	3,077
Timber, box, cut to size, undressed	23,051	8,155
Timber, box, cut to size, dressed or partly	18,863	20,759
Hickory, undressed	4,196	3,379
Architraves, etc.	31	22
Timber, other free	156	90
Veneers, three-ply	40,470	18,657
Veneers, n.e.i.	3,155	1,953
Churns, etc.	22,038	19,211

This classification includes wood-split pulleys, window screens and frames, washboards, washing machines, staves, etc., wholly or partly finished. The imports from Canada were, approximately, valued at £2,400, which included some sample shipments of British Columbia veneers. The importations under this miscellaneous schedule in the last two years are shown above.

Furniture Company Makes Toys

One of the first Canadian firms to turn its attention to the manufacture of the toys formerly bought in Germany and Austria was the Victoriaville Furniture Company, Victoriaville, Que. Within a few days of the declaration of war they turned their attention to this trade. It was naturally an experiment, but with large amounts of waste lumber at hand, prospects were good, and the result has shown that there was an opening for well-made Canadian wooden toys, such as picture blocks, doll's furniture, and juvenile furniture. A start was made with doll's furniture, and gradually the lines have been extended, and will be added to.

German and Austrian goods of this description were cheap; it has been the policy of toy companies to educate the public into purchasing better grades, ones that will not fall to pieces within a week. This means higher prices, but in reality greater value.

The method of the Victoriaville Company is to take orders for a certain number of months; then practically the entire factory staff is concentrated on the making of the toys until the orders are completed, the ordinary furniture making being suspended. The lines are, as a matter of fact, almost similar, except, of course, that the toys are on a miniature scale. The pieces go through the every-day processes of furniture manufacture, with a slight departure here and there to meet special conditions.

The juvenile or toy furniture includes goods in white enamel and mission and surface oak finishes, some sets having floral decorations and others inlaid cretonne. The range of articles is extensive, the goods being duplicates of the ordinary lines put out by the firm. Thus we have bureaus, cupboards, china cabinets, desks and chairs, dressers, Morris rockers and chairs, china closets, bookcases, and sofas. The last-named are upholstered in various materials and, when opened, form a box, in which children are able to keep many things. Each piece of furniture is packed in a corrugated cardboard box, which enables the goods to be kept dust-proof for a long period.

The doll's furniture is naturally not of such a high grade as the juvenile. Each line is made in various sizes, the goods being finished in natural wood varnish, gloss and white enamel. The catalogue includes chiffoniers, bureaus, china cabinets, and sideboards.

The company also make rockers and platforms for papier mache horses and shoo-fly rockers. The latter are in three patterns. The rockers for these and for the papier mache horses are of elm, bent on metal forms. The bodies of the shoo-fly horses are first dipped in varnish solutions and the painting or decorations printed on by the ordinary furniture printing machines, stencils being substituted for the imitation veneer patterns.

The Victoria Toy Manufacturing Company, a subsidiary of the Victoriaville Furniture Company, makes the papier mache horses referred to above. This is a new Canadian industry, these goods having previously come from Germany and Austria. Mr. Paul Tourigny is the president, Mr. J. E. Alain vice-president and secretary, and Mr. O. A. Thibault managing director. The horses are constructed by placing layers of papier mache on plaster of paris moulds, made in two halves; the papier mache, on being taken off the moulds is joined, making a complete horse, reinforced with steel rods, a Canadian invention. The goods are baked, painted, and dappled, the latter by a painting machine made by the Paasche Air Brush Company, of Chicago. The various trimmings—all made on the premises—are then fitted, and the process is complete.

Increasing Yield of Turpentine

Field tests by the federal forest products laboratory at Madison, Wis., U.S.A., to determine the amount of oleoresin obtained from longleaf pine, show that chipping with a one-half inch streak twice a week produces a yield about thirty per cent. greater than the standard method. These tests indicate the possibility of very greatly increasing the yield of turpentine and rosin now secured in the naval stores industry. A microscopic study of material collected in turpentine camps of Missouri, Louisiana and Florida clearly demonstrated the advantages of conservative operations.

There is nothing impossible to the resolute, determined, masterful will of man in the great field of opportunities that lie before him in the business world of today.

The Lumber Market

Domestic Woods

It is very difficult to make any forecast in regard to either the probable production or prices on Canadian woods. Wholesale lumbermen interviewed on this subject are very lacking of information. The production this winter is expected to be exceptionally light, owing to the fact that costs of logging have advanced to a point where loggers are rather afraid to take a chance on producing for fear they cannot realize on their cut when the spring comes.

There does not appear to be any possibility of a reduction in logging costs, as the labor situation is getting worse and prices of food and camp supplies are advancing, if anything.

As far as the demand for lumber from the furniture factories is concerned the situation is pretty good, but one wholesale lumberman who has shown an aggressive policy this last couple of years in securing stocks for future business is at the present time in a quandary. He said that, while he did not anticipate any falling off in the demand from the factories, yet he was rather afraid to take a chance on paying the prices that the mills are asking.

Another wholesale lumberman is inclined to think that the prices at the mills should be less this year than last year. He states that the demand last year for ammunition box ends put a premium on low end 1 in. hardwood to the extent of from $6 to $8 over what it could be sold at for ordinary commercial purposes. This same party gave it as his opinion that 1¾ in. and thicker lumber will remain, in the common and better grades, at close to the present market prices.

From the various opinions expressed it is very difficult to draw any definite conclusions. There is hardly likely to be any appreciable change in prices, however, for at least several months.

Prices at Toronto for car lots are: White ash, firsts and seconds, 1½ and 2 in., $79; birch, firsts and seconds, inch, $58; basswood, firsts and seconds, inch, $51; soft elm; firsts and seconds, inch, $47; rock elm, firsts and seconds, 1½ and 2 inch, $65; soft maple, firsts and seconds, inch, $48; hard maple, firsts and seconds, inch, $51; Douglas fir, Nos. 1 and 2, 1 inch, clear, $52.

Imported Woods

Heavy buying on the part of the government for war preparations is the outstanding feature of the lumber situation in the United States at present. There has been an enormous demand for heavy stocks of oak and ash for government work, as well as special widths in walnut, quartered oak, and mahogany for aeroplane blades. Prices have been higher than they have been in years. There is a little reaction at the preent time, but it is not expected to last long, due to the scarcity of labor in the producing sections of the country. The high price of food and labor makes logging expensive, and it is difficult to see how there can be much of a reduction in prices. Dry stocks are expected to be rather scarce and difficult to get this winter.

In the furniture manufacturing sections of the United States business is reported to be good. During the past thirty days furniture firms have been placing orders in fairly large volume. Lumber stocks in the South are badly broken. While on some items the stocks are fairly good, experts say that a canvass of the market situation would develop the fact that most of the mills in the South are oversold for perhaps sixty or ninety days. The unusually heavy demand for heavy oak and ash to be used in the manufacture of wagons, trucks, implements, and for shipbuilding use has caused many manufacturers to specialize in this class of stock, thereby curtailing the output in those thicknesses that are in demand by the furniture trade.

The situation with respect to gum, poplar, etc., is much the same. Large quantities of these woods are in demand for wagon and truck bodies and in the lower grades for boxing and crating supplies for overseas shipment. Dry stocks are, therefore, very much depleted. With this condition existing at the present and the probability of further demands being made for stocks entering into the manufacture of articles of this kind, indications are that the present level of prices will be maintained during the period of the war.

In regard to the veneer situation, one prominent veneer manufacturer states that the only cloud in the sky at present is the question of help. He states that thousands of the husky young fellows employed in the logging and millwork industries have enlisted or have been drafted into the army, thus causing logging and millwork operations to be seriously handicapped. Another veneer manufacturer states that there is an overproduction of veneers, and that business is moving a trifle slowly on this line. The freight car situation is also rather serious, but it is expected that in another month or so it will ease up and not much further trouble will be experienced in that direction.

Pushing Oak for Furniture

The scarcity and high price of steel has made an opening for the use of wood in the manufacture of certain kinds of furniture which has heretofore been made of metal. The dealers in oak are not backward about meeting the needs of furniture makers who cannot longer use metal. J. T. Kendall, secretary of the American Oak Manufacturers' Association, has sent letters to manufacturers of metal furniture and cabinets, offering to assist them in the purchase of oak. Following is a copy of Mr. Kendall's letter:

Owing to the great scarcity of steel and other metals which are being used and conserved for war purposes we presume you will be using considerable oak in the manufacture of your products. The government is needing all the steel now that can possibly be turned out, and if in line with the policy of conservation of war materials as advocated by President Wilson, the Chamber of Commerce of the United States and other commercial organizations, it is your intention to take up the use of oak, this association desires to assist you in securing all the material which you may require. We would thank you to advise us as soon as you can of what your needs will be so that our members can cut the stock which will fill your requirements. Also, if you should happen to be in the market for any oak now and will send us a list of your requirements on the enclosed post card, we will gladly bulletin this information to all of our members and those in position to furnish you this stock will then quote you direct.

Work without method is like a shot without powder; there is nothing to drive it home.

BABBITT METALS

By W. G. Harris, President, The Canada Metal Co., Toronto

W G. Harris
President The Canada Metal Co.

The real serviceable value of a babbitt does not necessarily bear any relation to the intrinsic or commercial value of the elements from which it is made.

To illustrate this fact: add five per cent. of gold to any of the high grade babbitts and it will make them cost about fifty times as much, but it is quite evident that it will not make them wear fifty times as long.

The real serviceable valne of all babbitt portioned to their regmetals is directly proistration in the physical properties which cover the conditions they are required to meet in service; and the value of all those physical properties increases in all metallic mixtures of perfect chemical affinity, and decreases as they recede from that condition in the mixture. Therefore, it is self evident that to add any element to a metallic mixture in excess of the amount required to produce a perfect chemism would operate to disturb its molecular tension, which would injure the quality of all its physical properties and reduce its value as a babbitt metal. For this reason the most economical and satisfactory service is secured through the aid of an expert metallurgist who, knowing the physical properties required in the babbitt, goes to work in a scientific manner to produce a chemically united alloy at the least possible expense, which will possess the required physical properties.

Invention and discovery in the line of metallurgical processes have within the last few years made some of the formerly rare elements available for use in this line of work, which enables closer chemical affinities to be established between the elements of metallic mixtures; and the expert metallurgist of the present age can design metallic alloys to meet special physical conditions with the same dependable accuracy that the expert mechanic designs special machinery.

A bearing metal has one definite service requirement, that is, to take care of the vital parts of machinery (the bearings). This cannot be accomplished with metal that is too hard or too soft. One increases friction, heat and wear, while the other may not stand the load weight or speeds, but mash or squeeze or disintegrate. The mechanical problem is the simple solution of what is the limit of load weight to which the bearings of any machinery may be carried. That limit every intelligent mechanic knows cannot exceed 2,500 pounds load weight to the square inch of bearing metal without disastrous results to the machinery, by either stalling the machine, destroying the bearings, breaking the belts or wrecking the weaker parts of the machinery.

Investigation will prove that 75 per cent. of the machinery in operation does not carry as much as 1,500 pounds load weight to the square inch of metal in the bearings.

Physical Properties of Babbitt

The properties of a babbitt metal which determine its real serviceable value are as follows:

First.—Tensile strength, the index to a babbitt's wearing quality. That is, the greater the force required to overcome the molecular tension of a metal, or a straight pull, the greater will be the wearing force or friction required to overcome molecular tension at its wearing surface.

Second.—Resistance to crushing strain; the index to a babbitt's carrying capacity.

Third.—Elastic tension, the index to a babbitt's ability to resist vibration or pounding.

Fourth.—Resistance to heat; the index to melting point.

Fifth.—Anti-friction quality; the index to the degree of angle at which the factor of friction is overcome by the force of gravitation.

Regardless of their constituent elements, babbitts which register alike in the above physical properties will give like results under like conditions of service.

To obtain results from babbitt metals such as will enable one to guarantee efficiency there must be extreme care taken and the methods adopted at the Canada Metal Company's plant are at once interesting, particularly from the fact that a uniform alloy is absolutely assured.

First, the metals to be used are tested for purity by a metallurgical chemist, and when everything is found satisfactory the melting process begins, and when each particular grade is being made no less than thirty-five tons is made at once. In fact, there are three of these monster pots operating daily.

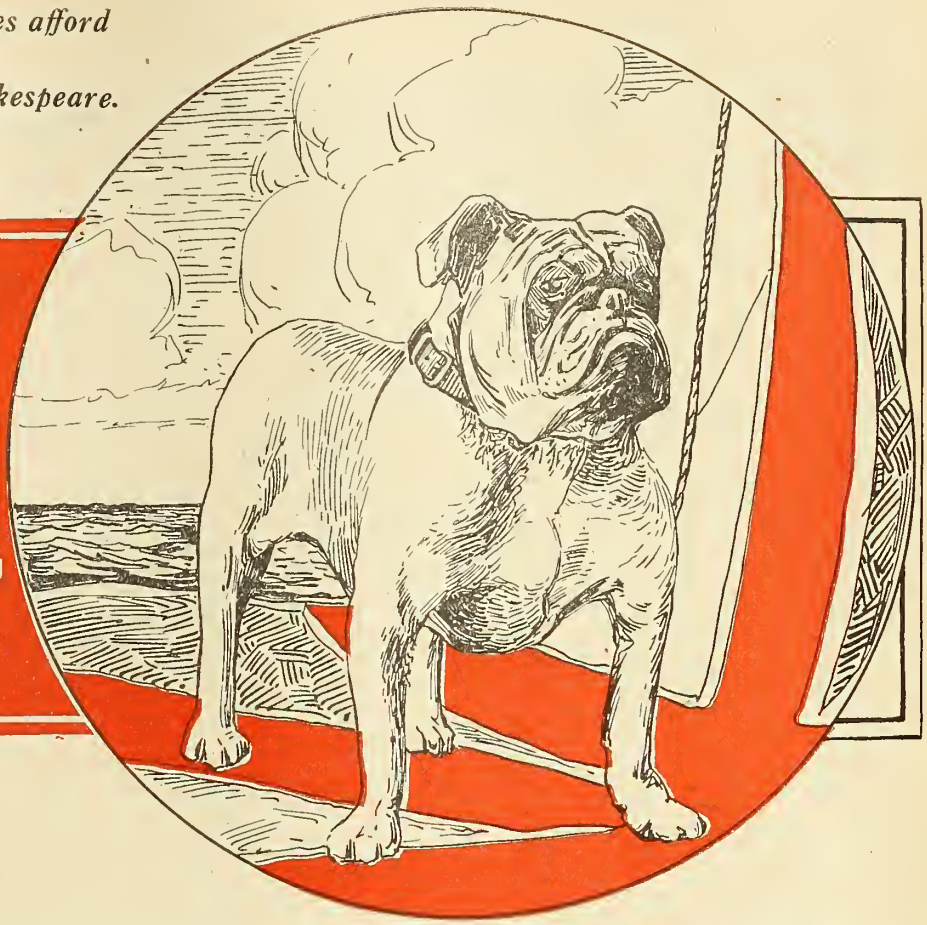
During the melting many tests are made to ensure a

(Continued on page 104.)

View of corner of the laboratory—The Canada Metal Co.

"The purest treasure mortal times afford is spotless reputation....."
—Shakespeare.

"What We Have We Hold"



Canada's Favourite Line

GOODS manufactured by THE CANADA METAL CO., Limited, have proved their value by capturing a good portion of the world's Babbitt Metal Trade, and continue not only to ***hold it*** but to increase it.

We Have

the reputation for manufacturing the best Babbitt Metals in the World.

We Hold

this reputation by manufacturing only Babbitt Metals that give excellent service.

HARRIS HEAVY PRESSURE

"The Babbitt Metal Without a Fault"

Specially Built for Machinery in Furniture Factories

Is matchless for general machinery bearings.
Will not crack or squeeze out.
Will run cool at any speed.
Is copper coated and copper hardened.
Is in fact an ideal Babbitt Metal.

We have everything in Metals and are the largest exclusive Metal Dealers in the Dominion of Canada. We have pleased the most discriminating of our patrons, and we are certain, therefore, that our products will give more than ordinary satisfaction to users of Babbitt Metals in any part of the world.

Our reputation for quality and square dealing wins us new business everywhere. Order a box from our nearest factory.

We manufacture

SHEET LEAD

Uniform in quality and thickness. Send us your specifications.

The Canada Metal Co., Ltd., Toronto

HAMILTON MONTREAL WINNIPEG VANCOUVER

THE FINISHING ROOM

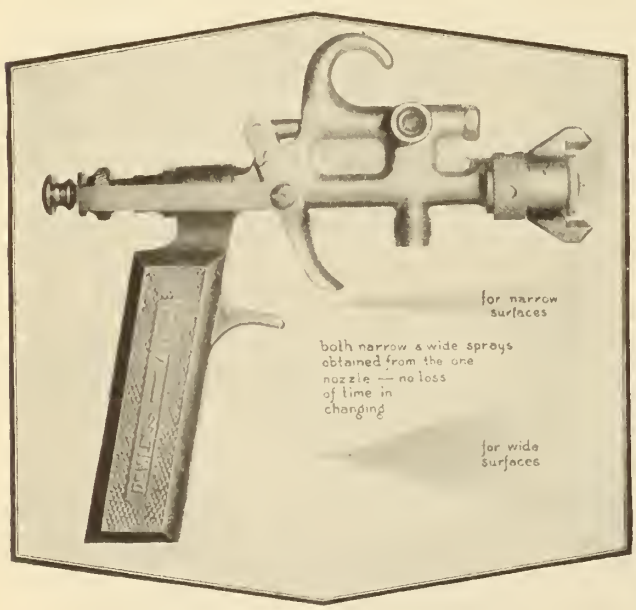
Greater Production in the Finishing Room

By R. D. Waltz of the DeVilbiss Mfg. Co.

It is unnecessary to dwell at any length on the fact that now, as never before, within recent years at least, production in the average, or even the best-managed manufactory, at anywhere near a normal cost approaches the impossible. What it is necessary to keep driving home is the fact that every manufacturer, if his business is to continue, must make a constant effort to meet, if only partially, this new order of producing conditions.

It has long since been recognized on every hand that a spray system of painting with air, which is practical and reliable, is the most efficient, economical, and satisfactory varnishing or finishing method to be had. And it is to-day recognized as a factor which is contributing more, perhaps, than any other toward keeping the cost of the finished article somewhere within reason. Now, with the recent introduction of an improved type of spray machine, as a part of the DeVilbiss Aeron System, possibilities are logically claimed for still greater speed and economy and better results in the finishing department, especially in spraying work which combines both large and small surfaces.

This new machine, known as the Type K Aeron, provides for an advantageous application of any liquid finishing material on the narrowest to the widest of



Illustrating the spray adaptability of type K Aeron.

surfaces without any changing of nozzle or stopping of work, enabling the operator to do with it all the work that formerly required not less than two different machines. As a consequence of the "complete in one" feature there is greater uniformity of finish, a big saving of material, and other important advantages possible.

Furniture of all kinds and classes and the product of other woodworking plants, differing in character and make-up in practically every piece, oftentimes present finishing problems difficult of a satisfactory solution. It is readily apparent how the wide adaptability of this newly developed machine will afford relief to any condition of this nature.

Whether working with under or finish coats, all the operator has to do when he comes to any small parts is simply to turn the spray head, with the machine in operation, and the narrow, concentrated spray is obtained; as he returns to the large surfaces the spray head is again turned and the wide, fan-like spray produced. In every case he has at his "fingers' slight turn" the type of spray best suited to the work in hand.

In view of this and the instantaneous and accurate trigger control giving instant fluid adjustment, the regulation of wide or narrow spray from the finest line to full capacity of nozzle, the light weight of the machine and the ease with which almost inaccessible spots and places can be reached, maximum speed in work is assured at an appreciable reduction in cost. Elimination of the stopping process to change machines or nozzles for a variety of work, making possible a continuity of material application, ensures a more perfect grade of finish, and saves many golden minutes, which now are, unquestionably, at a premium.

There is doubtless no other branch of the woodworking field to which this remarkable device should appeal more strongly than to the furniture and kindred products. As has been pointed out, it particularly fits the peculiar finishing requirements of the products of this group of manufacturers, and adequately and surely provides for more and greater economies and working advantages, as well as a higher quality of work, than have ever before been obtainable.

Modern Methods in Finishing Room

By "Finisher"

The first item under this heading must be the spraying machine. It is in use in a good many Canadian furniture factories, and is undoubtedly the only efficient system of applying varnishes, shellacs, enamel coats, etc. It applies them with an evenness that far surpasses the coats applied with a brush.

Some manufacturers hold back from purchasing spraying machines because they think the waste of materials is excessive. The writer has watched a good many operators of spraying machines at work, spraying everything from long, thin strips for beads up to the largest surfaces, and is honestly convinced that the matter of material waste is very much exaggerated.

The system of controlling the spray is so sensitive that the operator, once he gets used to the machine, can almost make the thing follow his thoughts. I had an opportunity recently to watch a man spraying varnish on mirror frames. Now, here, if any place ,there would be an excessive waste of varnish. I watched for some

MARIETTA WOOD FINISH SPECIALISTS

FINISHERS

TRY OUR NEW

KOPALAC

The Latest Word in Spirit Varnishes

KOPALAC can be used practically everywhere Shellac is now used, and at a very material saving.

KOPALAC brushes on just like shellac.

KOPALAC can be sprayed on without fogging.

KOPALAC can be reduced with any quantity of alcohol without turning white.

KOPALAC is very heavy in body and will stand lots of reducing.

KOPALAC is ideal for a wash coating.

KOPALAC is made from a hard gum.

KOPALAC is guaranteed not to contain any rosin.

It has been tested and tested and tested—and the results of every test used as the basis for improvement—until now we have a product that is thoroughly practical—and that measures up to the MARIETTA standard in every way.

You be the Judge
Write for Sample

The

Marietta Paint & Color Co.

Marietta, Ohio

Southern Factory - High Point, N.C.

time so as to try and form some idea of the amount of material wasted. To my mind, the amount of varnish wasted is insignificant, unless the operator is absolutely careless. The owner of the plant in which these frames were being varnished was with me at the time, and I mentioned to him that I thought the waste not worth mentioning. He replied that they had made some experiments with nozzles and then purchased an assortment. The waste, therefore, had been cut down to nothing.

In another factory, which had three machines in operation, one man was busy shellacing thin strips of wood that were used for glass beads. He laid them on a pair of trestles and coated them without difficulty. Even on the beaded edges it appeared to be quite easy for him to coat the strips with scarcely any waste of material.

The piano factories have not gone in for these machines as readily as the furniture factories. Having once worked in a piano factory for a considerable period, I know piano men regard the quality of the finish on their goods as being very much superior to the finish on furniture. If they think, however, that the spray will not turn out a good enough job for them they are mistaken.

I have seen the spray used on the highest grade furniture, some of it decorated with elaborate carvings and with mouldings having many intricate members. The work was superior to that turned out by an expert brush hand. Any piano manufacturer who is still skeptical should take the time to go and visit a plant making high-grade furniture and decide the issue for himself.

Piano manufacturers are no doubt up against rising costs of production, the same as any other manufacturer. They are turning out a product with a larger margin of profit, and are not pressed so close as the furniture manufacturer, but nevertheless there is room for them to cut costs. The piano finishing rooms that I am acquainted with have very large staffs and foremen finishers in these plants have told me that it is increasingly difficult to secure good brush hands. My advice to them is: "Don't look for brush hands; spray your finish."

After the varnishing comes the rubbing. The only objection I have against pneumatic rubbing machines is the row they make. I have no doubt about their efficiency, but I have never been able to stay long enough in their company to watch them without getting a headache. The men operating them appeared to be doing so with charming unconcern, so I judge that the noise and vibration is simply a matter that wants getting used to.

For flat stock, such as tops, etc., the large machine with the blocks that go back and forth is the best. The amount of stock that can be got over with this machine makes it a paying investment in factories having much flat stock to do.

With the exception of the varnish kiln, these three machines constitute about all the production increasers in the finishing room. Varnish dry kilns are in use in a large number of furniture factories, and are considered good equipment. It is possible to dry varnish in very much less time than was formerly possible. This permits a greater volume of work to pass through the finishing room in the same space of time.

War Necessitates Operating Your Plant with Less Labor

You want to maintain the Maximum Production. You can't do this unless your finishing department is Economically and Efficiently Equipped.

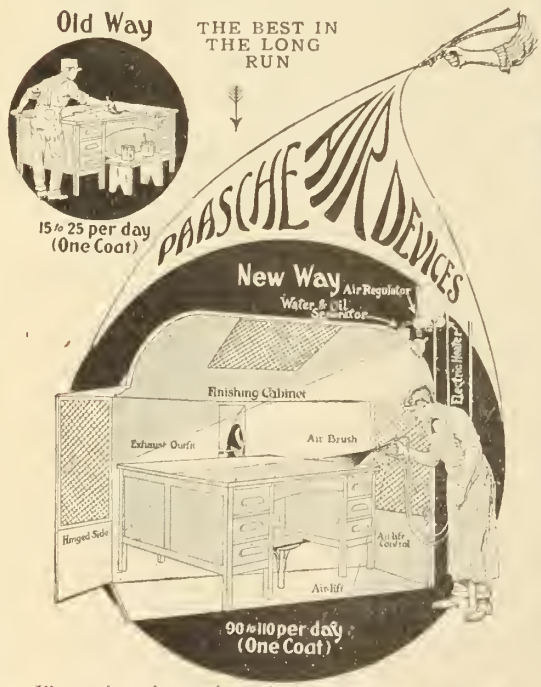


Illustration shows the old slow way and the NEW PAASCHE WAY of finishing. This equipment will do the work of four to eight brush hands, depending on nature and style of goods to be finished.

PAASCHE SUPERIOR FINISHING EQUIPMENTS

Cut your finishing costs 50 to 90%, and produce far superior finishes

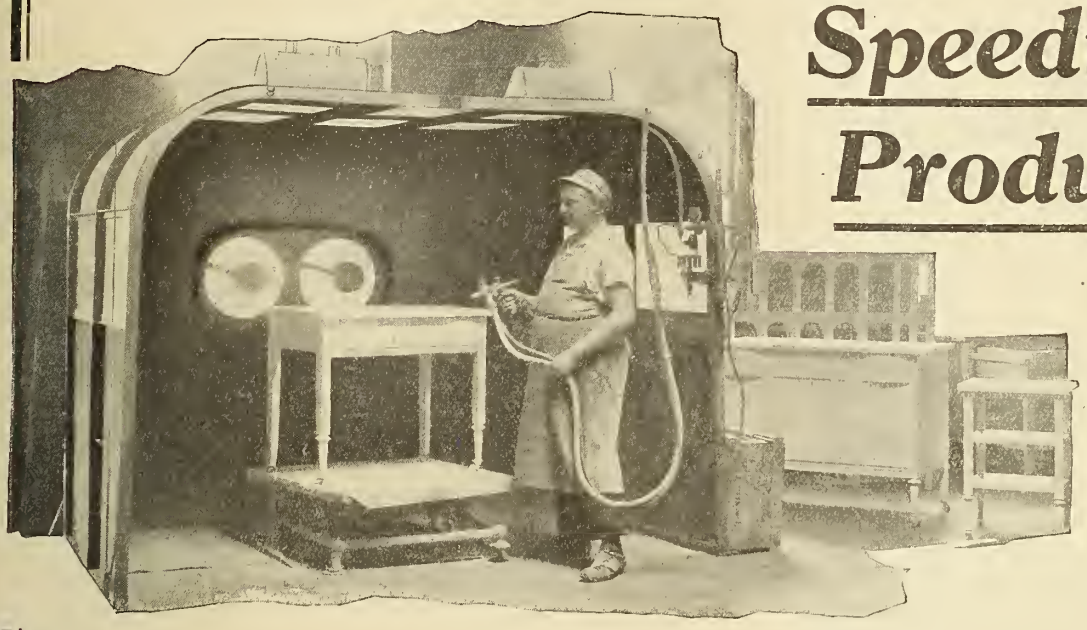
You Need and Should Use—

These greatest time and labor saving devices. Indispensable in modern plants at all times. Every vital point in finishing fully provided for. Unequalled for applying liquid finishing materials of every description.

← This most profitable investment "Pays Big." Thousands of greatly pleased users find it so. An inquiry places you under no obligation whatever. Our Canadian representative will call and go over the matter in detail with you.

Paasche Air Brush Co. Washington Blvd.—Willard Ct. CHICAGO - U.S.A.

For Bigger, Better and Speedier Production At a Lower Cost—



DOES the 30 minute job in 15 minutes or less, and

SAVES 50 per cent. and up in time and labor alone;

CUTS operating and upkeep costs to a negligible figure;

INSURES maximum exhausting results, making work healthful and pleasant.

The Aeron Finishing System
Surpasses Brushing
Practical—Complete Reliable Finishing Room Equipment

APPLIES shellacs, varnishes, enamels, paints, lacquers, and the like;

FINISHES any kind and class of wood or metal manufactured articles;

PRODUCES highest quality of finish required for the work in hand.

These **proved features** have an important meaning to the manufacturer not getting the proper and satisfactory speed, quality and economy out of his finishing department.

Moreover, **3,800 users** of the highest type, representing hundreds of different lines of work, give this equipment their enthusiastic stamp of approval—they are using it every day, and their experience and recommendation also have an important meaning to the manufacturer so situated.

Then, there is the Aeron System **Service Organization,** competent and efficient out of years of varied experience, following up the installation and always offering willing co-operation to get and improve results—still another important item to be seriously considered.

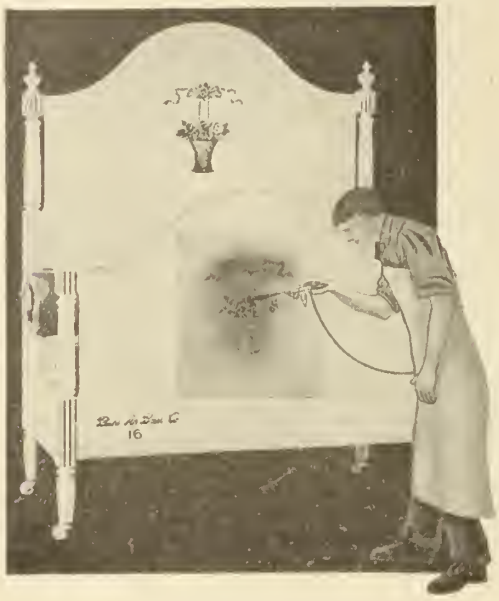
Let us send you complete equipment and operation particulars that will apply more strictly to your own class of work — ADDRESS —

The DeVilbiss Mfg. Co., 1318 Dorr St. Toledo, O., U.S.A.

Clean, white factory walls stimulate efficiency and production, and the Aeron System PORTABLE PAINTING EQUIPMENT supplies a quick, easy and economical method for applying the paint — complete details gladly sent.

Finishing With the Air Brush

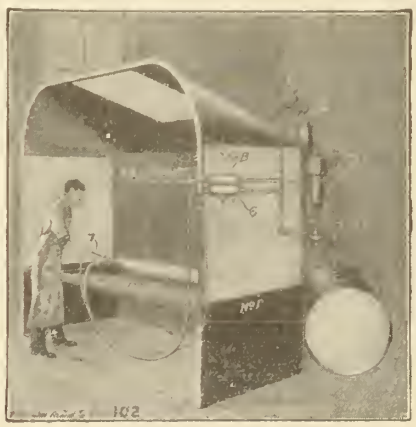
That the air brush system of finishing is the recognized modern method can be verified by visiting almost any furniture factory. In fact it would be interesting to know how many of these air brush finishing machines have been purchased by furniture manufacturers and other woodworking plants during the past couple of years. The writer has visited several plants quite recently in which air brush machines are used for



Stencilling with the spray

applying finishing materials, and in each case the management of the plant visited expressed their satisfaction with the results obtained.

The features of the machine are the speed at which the articles can be coated and the evenness with which the coats can be applied. A great many plants have found it advisable to install two machines and in some cases more, particularly if the capacity of the



The Paasche barrel feed

plant is a large one. When two machines are in use, one can be used continually for varnish and the other for shellac and enamelling coats. This combination has been found to work out to good advantage.

One of the leading manufacturers of air brush machines is the Paasche Air Brush Company of Chicago. The machines manufactured by this company are composed of the following units:—Finishing cabinet, exhaust outfit, water and oil separator, 100 lb. air regulator with gauge and air valve, electric material and air heater, model N air brush with container and hoses, adjustable container stand or block and tackle, turn-table or air lift, and compressor outfit of suitable size. These units are made in all sizes to cover various requirements.

For the heavier class of work, the outfits are equipped with a pneumatic floor lift which operates a turntable on which heavier pieces may be placed and handled with ease.

Any manufacturer who is looking for a means of reducing his finishing room costs and who has not already installed an air brush machine would do well to investigate its possibilities.

One of the accompanying illustrations shows the Paasche air brush being used for stencilling furniture; the other shows the Paasche Company's latest direct barrel feed, which they say has been found popular for varnishing, as it eliminates continual filling of containers, waste of labor and keeps material under cover and protected against deterioration. The materials and air are heated electrically to any temperature required and the air thoroughly separated from water and oil condensation.

Tests for Oils and Varnishes

By C. T.

One of the most reliable tests for raw and boiled oils is the flash test, the temperature at which linseed oils usually flash being 470 degs. Fahr., whilst mineral oil, which is the chief adulterant of linseed oil, flashes at about 400 degs. F., and resin oil still lower, so that the flash test is a simple method of detecting adulterants.

If the amount of the adulterant in the oil is to be ascertained weigh a portion and place it in a beaker or any suitable vessel, and add a small quantity of caustic soda, alcohol, and a little water. The contents of the vessel should be then boiled for some time, with constant stirring, after which the oil will be found to be saponified, whilst the adulterants will be unchanged. The mass is then poured into a separating vessel, and agitated with benzine until it takes up the mineral oil, which afterwards comes to the surface of the vessel. The bottom layer is then run off and the top portion is well washed with warm water until all traces of the saponified oil have disappeared. The residue, which is mineral oil, is placed in a vessel and weighed.

Common resin is also used as an adulterant, and may be easily detected, if in any considerable quantities, by painting some of the oil on any glass surface, and when it is thoroughly dry, rubbing well with the finger. If the oil contains much resin the film will leave the glass and crumble, whilst a good oil will not be affected.

The only reliable test for turpentine is distillation. The chief adulterants are shale spirits, Russian turpentine, resin spirit and coal-tar naphtha. The determination of the proportion of the adulterant would require special chemical apparatus, but a simple method is to warm a sample of the suspected turpentine and a sample of pure American turpentine. Should the suspected turpentine contain any of the above adulterants they may be easily detected by the odor, which is entirely different from the pure American turpentine.

Eagle-Ottawa Leather Co.

TANNERS OF

Furniture Leather

of every description

We are making a specialty of cutting

Spanish Split Leather for Chair Manufacturers

Quotations and samples furnished on application.

We will be pleased to supply a very attractive sample book, of all our grades on application.

Grand Haven - - - Michigan

Upholstery Leather

We carry in stock all grades in standard colors for immediate shipment

Spanish, Fancy, Enamelled and Goat Grain Finishes

Well Trimmed Hides — **The most economical leather on the market.**

Unsurpassed Selections — **Let us quote you on cut stock.**

Boullee Fraser Leather Mfg. Co., Inc.

230 Canal Street, NEW YORK

Save Money by Purchasing

"Made in Canada"

Veneered Panels

Maple - Elm - Basswood - Birch - Plain Oak
Quartered Oak - Mahogany - Black Walnut
Single, 3, 5 or 7 Plies.

YOUR ENQUIRIES SOLICITED

Hay & Company, Limited Woodstock Ontario

Perkins Vegetable Glue

The Best for Built-up Stock and Veneer Laying

Dinner wagon manufactured by the D. Hibner Furniture Co., Limited, Kitchener, Ont., in which Perkins Glue was used.

Perkins Vegetable Glue sticks and holds. It is unaffected by dampness, extremely dry atmosphere or severe sanding. We guarantee to effect a 20 per cent. saving in your glue room by replacing hide glue with Perkins Vegetable Glue. Along with this saving you can have a glue room comfortable as to temperature and sweet as to smell. The glue is absolutely uniform in quality. Every shipment exactly the same. Let us demonstrate in your own factory and on your own stock just what can be accomplished with Perkins Vegetable Glue.

PERKINS GLUE COMPANY, LIMITED, HAMILTON, ONT.

"Address all inquiries to Sales Office, Perkins Glue Company, South Bend, Indiana, U. S. A."

Veneers and Panels

Putting the Veneer Room on a Paying Basis

By Veneer Foreman

The writer has visited a number of plants recently where the owners do not appear to have made any attempt to speed up the production of their veneer departments in proportion to the increased capacity of the other departments. This was particularly noticeable in one large piano factory. They had increased the number of employees in the veneer department and considerably extended the floor space, but had apparently overlooked the improved machines that can be obtained.

I believe one reason for this oversight is the lack of advertising on the part of the manufacturers of improved veneer machinery. I have before me as I write copies of three of the leading American and Canadian trade journals—journals which practically all users of veneers are familiar with. A list of the veneer room equipment advertised is: Presses, veneer clipper, redrier, glue spreader, and edge trimmer. All these advertisements, with the exception of one, occupy a quarter page or less space.

The manager of the piano factory mentioned above may be casually aware of the existence of certain veneer room equipment, but he probably hasn't the slightest idea regarding its efficiency. The reason, no doubt, is that he has never had any reliable data placed before him. That the man is open to conviction is evident from the fact that he is using Perkins' vegetable glue. The manufacturers of this product are progressive, and if the same could be said of all the manufacturers of veneer machinery, the veneer rooms of the country would undoubtedly be better equipped than they are.

The plant that is turning out any quantity of veneered work and is still jointing their veneer by hand is losing money. Get a jointing machine with which it is only necessary for you to feed the stock in and have it come out ready to be taped together. The capacity of one of these machines will ensure a very greatly increased production in your veneer room—will, in fact, put it on an equal basis with the machine and cabinet departments.

With a jointing machine, of course, it is necessary to have a taping machine. When the stock is passed through the jointer it is ready to feed through the taping machine. You just simply feed it in—the machine does the rest. The capacity of the machine is on a par with the jointing machine.

Compare this method with the old system of tacking the veneer on boards and then brushing on the glue and sticking on the tape by hand. By the hand method about thirty or forty pieces of veneer, depending on the length of course, is about a day's work for a man. With some kinds of veneer he can't tack up and tape that many. At, say 35 cents an hour for a good man—and you can't afford to put a poor one on veneer work—your veneer would be costing you about 10½ cents apiece. Doing this work on a taping machine each piece would cost you a fraction of a cent. Then take into consideration the extra floor space required for benches when the work is done by hand.

Then, besides the jointer and taping machine, you need a band-saw and a veneer clipper. In regard to the latter, I know one firm that obtained a paper-cutter from a printer, who wished to dispose of it in order to get a smaller one. It worked capitally. The band-saw is a very necessary part of the veneer room equipment. One factory in which the writer worked he had to take his veneer from the basement up on the elevator to the fifth storey, mark it and cut it to length, then take it down to the band-saw on the first floor, cut it, and take it to the fifth storey again to joint and tape it. After this it had to be delivered to the veneer-laying department on the second floor. Inefficiency! Well, I guess yes!

Of course, a glue-spreader is necessary. In this connection I would like to point out that animal glue for veneering is a back number. The product put out by the Perkins Glue Company, and known as vegetable glue, is very much superior to animal glue. The points in its favor were well described by a writer in the June issue of the "Canadian Woodworker." Perhaps it would not be out of place to repeat them here. They are: "No possible danger of glue being deteriorated by heat; cauls do not have to be waxed to keep them from sticking; glue does not come through veneer, thus money is saved on the sanding operations and in the finishing; cauls are not damaged through removing glue from them, as the glue does not squeeze out; about 20 per cent. greater spread can be obtained than with animal glue; no danger of glue setting before stock is put in press; no heating of cauls required; veneer room is free from smells and more agreeable to work in." If these arguments are not sufficient to convince the confirmed user of animal glue, then I can't convince him.

The equipment described in this article will put your veneer room on an efficient basis and enable you to speed up your production to the limit. And, right here, let me say, if you are manufacturing talking machine cabinets, you cannot afford to overlook your veneer room. You cannot afford to overlook it in any case, but with talking machine cabinets particularly your watchword is "quantity production."

It calls for some courage to do only the best work when competitors around you are using inferior materials and making their bid for trade on price lines exclusively; but it is the kind of "courage" that pays in the long run.

Toronto Veneer Company's New Home

The attractive building shown in the accompanying photograph is the new home of the Toronto Veneer Company, at 1100-1104 Queen Street West, Toronto. This firm was formerly located at 93-99 Spadina Avenue, Toronto. In their new quarters they have ample accommodation for the large stocks of figured walnut, mahogany, quartered oak, gum, and poplar veneers which they carry. They have two floors approximately 50 feet by 100 feet, and at present they are carrying about $40,000 worth of veneer.

A feature of this new building is the excellent lighting, which permits customers to see just what they are buying. It will be noticed from the photographs that the large windows in the front extend up to the second storey. Besides these windows, the entire back end of the second storey is glass, in steel sash. Abundance of light is therefore provided.

Toronto Veneer Company's new premises at 1100-1104 Queen St. West, Toronto.

Laying Veneers Properly

By Richard

Properly laying the veneers, or, in other words, laying the veneers upon the core body in such shape or manner as to cause the least amount of trouble, is one of the most necessary essentials towards attaining a successful veneered product.

To work towards this end it may be well to keep in mind certain conditions which increase the labor on the veneered product unnecessarily and needlessly. Among these may be mentioned the careless laying of the thinner veneers and over-pressure in the gluing-up operation.

Many a handsome face veneer is ruined through being sanded off in places where indentions were made in laying, often caused by an improperly cleaned caul board or having particles of edge cuttings fall between the face veneers while in the act of laying, resulting in a partially defaced, if not entirely ruined, face veneer.

Another cause of the ruination of some face veneers is that where thin veneers are used, just as much pressure per square inch of surface is used as is applied when 1/8, 3/16 or 1/4-in. face veneers are used. Thus it often happens that the fiber structure of the face veneers is crushed to such extent that refacing is the only way out of it, in order to avoid the often-complained-of hair-line checks observable in some of the finished product, and which often cause hair-splitting arguments between the veneering and finishing departments as to their origin.

Where hair-line checks appear in thin face veneers it may be duly vouched for that 90 per cent. of the trouble could safely be attributed to over-pressure instead of blaming it upon moisture or the glue, and at times upon the methods of finishing employed.

In other instances, part of each of the troubles mentioned, together with utter disregard as to putting the face side of veneer out, may be the contributing factor towards improperly-laid veneer, causing checks of hair-like nature as soon as the thin outside film is sanded off, if the face side of same happens to be turned in. And yet there are glue-room men who will dispute the fact that there is any material difference between one side or the other.

Then there are others, when laying up three-ply panels with 1/8-inch core body and 1/8-inch face veneers, who will pay no attention whatever as to whether the core layer is broken or otherwise defective, and instead of at least cutting the split ends square on the saw, so as to prevent overlapping when building up the form, or getting a uniform, even surface, they will pile their stock pell mell, one on the other, whether the cores are split, broken, checked or have holes in them. It matters naught to them; filling up the forms seems to be their ambition, and this they certainly do, without giving the least thought as to the appearance and condition the panels may be in after they leave the glue room.

Still another cause of the improperly-laid veneer is the fancy whims or modes some men get. They get the impression that their own-invented mode of laying veneers should be the only correct way. I will cite a few examples which I have noticed while observing methods in use in different glue rooms.

In one glue room the men were found busily engaged in toothing some stiles and bottom-rail cores for veneered doors. When inquiry was made as to what was gained by this method, the glue-room man replied in this manner: "The cores are the most important part of this product, and if there is any hole or depression on the surface of the core where any glue could find lodgment, we discover it at once and promptly remedy the defect before it is veneered."

While from this old gentleman's point of view his method is theoretically all right, it was entirely all wrong the other way. It may have been that this firm prided itself on turning out a product of quality rather than quantity, and it may have felt well repaid for these extra efforts made, but if this really was an absolute necessity, wouldn't the drum sander have done this work with a coarse grit paper, at much lower cost and in a quarter of the time?

There was another plant in which the gluing was done by means of the glue-spreader. In fact, the

OAK MAHOGANY CIRCASSIAN MAPLE

VENEERS

BIRCH POPLAR CHERRY WALNUT GUM

THE OHIO VENEER COMPANY

Importers and Manufacturers

Foreign and Domestic Veneers and Hardwood Lumber

We always carry a large and assorted stock of Mahogany, Circassian Walnut, Sawed and Sliced Quartered Oak.

Send us your enquiries and orders. We guarantee good service.

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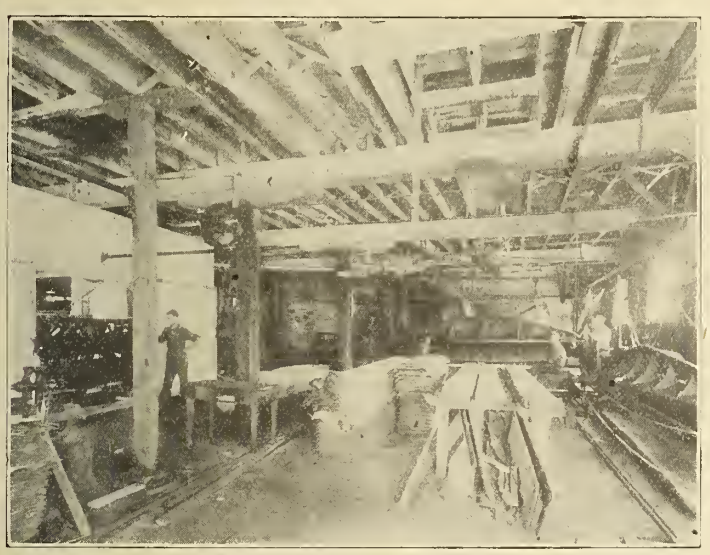

That's our slogan because the flake in "H.B." veneers produces such a rich figure that there is no mistaking it.

HB

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Established 1867
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OAK VENEERS

Honest inspection and intelligent selection gained in fifty years' experience enables us to produce the very finest veneers. Our product is made exclusively from Indiana White Oak—the best that grows for our purpose.

A trial will convince you

Hoffman Brothers Co., 800 West Main St. Fort Wayne, Ind.

EMPIRE VENEER COMPANY, Inc.

Manufacturers of

Mahogany
American Walnut
Quartered Oak
and Other Fancy Cabinet Woods

Office and Show Rooms, 14 E. Jackson Blvd.

Chicago

JOHN D. LASKY, President

Write us for samples

BUYERS OF VENEERS AND PANELS

will find it to their advantage to purchase from the manufacturers and dealers whose advertisements appear in this publication. They are progressive firms—the leaders in the business, which is a guarantee of good service and prompt attention to orders.

Give your business to the man who will spend his time and money to get in touch with you. He deserves it—if his stock and prices are right.

OAK MAHOGANY CIRCASSIAN MAPLE

VENEERS

BIRCH POPLAR CHERRY WALNUT GUM

Wood - Mosaic Co.

NEW ALBANY, - - IND.

WALNUT

Lumber - Dimensions - Veneers

If you are in the market for anything in Walnut, let us figure with you. We have cut three million feet of Walnut in the last year, and have a good stock of all thicknesses dry. We can also furnish Walnut dimension **Walnut Veneers.** We have a large stock of veneers, plain, stripe figured and stump wood.

Wood-Mosaic Co., Inc.

NEW ALBANY, - - IND.

QUALITY

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QUALITY

Write for prices on all

Plain and Fancy Lumbers and Veneers

Mahogany, Oak, Birch, Walnut, Ash, Poplar, etc., rotary, sliced or sawed in all thicknesses

Your Patronage Respectfully Solicited

Prompt attention given to all enquiries, and SAMPLES SENT IMMEDIATELY ON REQUEST, or representative will call.

George Kersley

224 St. James Street, Montreal

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AMERICAN WALNUT VENEER

Have you seen samples of the Wood we are producing?

A large line of the finest AMERICAN WALNUT VENEERS in Sliced, Half-Round and Stump Wood is ready for your inspection.

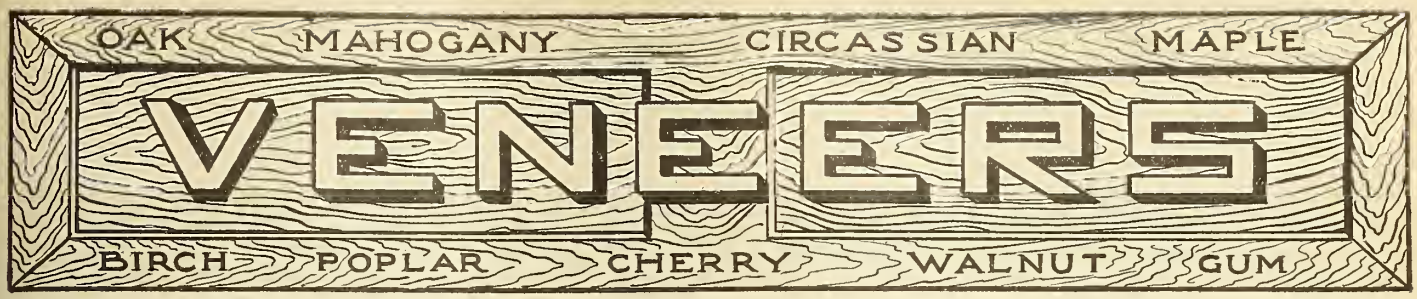
The beauty about it is its uniformity and can be matched by us at any time.

No freaks, but good solid substantial and well manufactured Veneer that causes a consumer to create his lines knowing that it can be maintained.

A wire or letter is all that is necessary.

Roberts Veneer Co., New Albany, Ind.

"The Pioneer Walnut Veneer Producers of America."



Mahogany **Figured Red Gum**
American Walnut **Curly Birch**
Quartered White Oak
(Sawn or Slice Cut)
And all other kinds of

Domestic Veneer

AND

Thin Lumber

ACME VENEER & LUMBER CO.

8th, Harriet and 7th Streets - - - - CINCINNATI, Ohio

We can ship

IMMEDIATELY

2 cars of 1/20 in. Unsel. Gum Veneer.
4 cars of 1/4 in. Unsel. Gum Veneer.
3 cars of 1/8 in. Unsel. Birch Veneer.
2 cars of 1/16 and 1/8 in. Red Oak Veneer.
15 cars of Panels, 3/16 to 1/2 in., in various woods.

GEO. L. WAETJEN & CO.

MILWAUKEE - - - WISCONSIN

Veneers and Panels

PANELS

Stock Sizes for Immediate Shipment. All Woods. All Thicknesses. 3 and 5 Ply or made to your specifications

VENEERS

5 Million feet for Immediate Shipment
Any Kind of Wood Any Thickness

We are Chicago agents for WOCO FIR PANELS, and carry a full and complete line in all stock sizes and all thicknesses at our Chicago warehouse for immediate shipment.

J. J. NARTZIK

1966-76 Maud Ave., - - CHICAGO, ILL.

AT GRAND RAPIDS

READY TO SHIP

Poplar Crossbanding
Gum Veneers
Plain Oak
Quartered Oak
Mahogany

Immense Stocks — Right Prices
Write us

WALTER CLARK VENEER CO.

Grand Rapids

equipment seemed to be pretty well uptodate. This glue-room crew, however, seemed to have a mode all its own for gluing and laying veneers.

Conveniently near to the glue-spreader they had a series of rack-like forms, in which the core bodies were placed after being glued on both sides. This, they said, was absolutely necessary to chill the glue somewhat before laying the veneer, claiming that the laying of veneers on steaming glue was contrary to the principles of good gluing, and that by their process the glue was cooled off just enough so the heat of the glue would do no harm to the veneers, and still retain its full gripping power. They claimed they had practically no veneer trouble and would not think of laying veneer any other way.

While they may have been able to do gluing with results to suit themselves, nevertheless the writer should hate, personally, to run into a job of gluing of this type, where the above method would have to be followed precisely. If this method isn't tempting fate as regards resulting loose veneers and blisters, I would like to know what it is. Yet, apparently, they seemed to be perfectly satisfied with the results they were obtaining.

Regarding the proper laying of veneers, undoubtedly the old saying that "what's one man's meat is another's poison," holds true. In no trade or line of manufacture are there such varied forms or rules followed as in the art of laying veneers. Each plant's methods differ slightly from the others. When this is taken under consideration it seems almost remarkable that very little defective veneering ever reaches the markets.—Veneers.

Veneer Taping Machine

Due to the speeding up of machine and cabinet rooms through the installation of time-saving machinery it has been found necessary in many plants to devote some study to the veneer department so as to increase the capacity of this department in proportion to the others. One of the most laborious jobs in the veneer department, and one that consumes a great deal of time, is the taping of veneers.

The Preston Woodworking Machinery Company, of Preston, Ont., handle a taping machine which is worthy of the consideration of those manufacturers who are up against the problem of increasing the production of their veneer department. The company state that with this machine four men can do the work of eight, and that the machine will handle either thick or thin veneer and will use ordinary gummed tape or plain paper tape, putting on its own gum or glue just before the tape is laid. Either steam or electric heat can be used for keeping the glue in proper condition.

This machine is made by the Black Bros. Machinery Company of Mendota, Ill., and handled in Canada by the Preston Woodworking Machinery Company. After the veneer has been jointed, the two pieces to be joined together are started into the machine, and the tape is applied mechanically. The speed with which the machine applies the tape ensures a much greater capacity for the veneer department.

Besides this machine the Preston Woodworking Machinery Company have a number of other machines of interest to the woodworking trade. Special mention might be made of their No. 162 high speed ball bearing shaper. The easy running of this machine has made it a favorite in a number of plants.

Propellers from Built-Up Stock

A finished propeller is a simple thing to look at, but there goes into its construction as much skill and care and craftsmanship as into the production of a drawing-room suite. In the construction of an air screw due consideration must be given to the kind of wood employed—generally walnut and mahogany nowadays—speed of the machine, wind resistance, weather effects, level flying, climbing, flying at sea, flying in tropical climates, etc. The blade of a propeller contains several alternate layers of walnut and mahogany, securely clamped and glued together by a process which continues through about six days. A special kind of glue is used, and this again is an article which glue manufacturers have evolved during the war and contributed to the effort for high efficiency.

After this clamping process is complete the propeller passes into the hands of a craftsman, who gives it the approximate familiar shape. Then another man, by skilful hand-planing, brings it to the requisite thickness and smoothness stipulated by the air department. The fineness of the work is seen when it is stated that the screw must be gauged in thickness to one thousandth part of an inch. Then it must be coated over with a specially-prepared varnish—yet another contribution from a branch of the furniture trade—which gives it a high polish, and is particularly weather-resisting. All that is then wanted is for the government inspector to pass the article "fit for general service."

A boring machine has been evolved which is primarily designed for boring the bosses of airscrews and propellers, but is now also largely used for recessing and routing out panels in the ribs and spars of aircraft, either from the solid wood or from the now largely-used three-ply material. The ordinary type of boring machine, it was found, failed to satisfy the demands for exact work and range of movement required in boring and recessing propellers. This machine is claimed to leave a perfectly clean and true centre hole in the boss of the largest propeller, using a two-wing twist pit, as known to most machine woodworkers. When recessing panels in the ribs and spars of aircraft, a special profiling or forming plate is made to use below the work, and thus gives the shape of the panel required.

The association of upholstery with aeroplanes will not be so readily understood. Yet it exists. There is no reason why the interior of the fusilage should not be made as comfortable as possible. For the pilot and passenger a suitable seat must be provided, and at present these are of leather or of padded leather and wickerwork, such as that emanating from the Aircraft Supplies Company. But in this section the future holds more than the present has provided. Aircraft will become more reliable as vehicles for ordinary conveyance, and it is not too much to suppose—in fact, it is reasonably certain—that the flying machines will be fitted out as luxuriously as the modern motor car.

There is no reason why the upholsterer should not undertake the task of bringing out the wing or plane proper. After all, many articles of furniture can be said to consist in their chief essentials of framework and covering. Whether the fabric in general use for covering wings at present—that is, Irish linen—is the best, and will always be used, is a debatable question, and experiments in reference to the utility of other materials are by no means outside the province of the makers of textile fabrics.—The Cabinet Maker.

Concerning Our 60,000,000 Feet Production

WE HAVE emphasized our **ability** to give **service.** Just how far beyond that of the average operation does this ability require progress? The ratio reaehes surprising proportions in an operation which has reached the point of expansion demanded by an annual cut of 60,000,000 feet of hardwoods. For any business must show constant growth or stagnation. Growth, then, of our institution means expanding in a measure whieh would represent a sizable business in itself.

This is in no way a boastful comparison but merely a frank effort to give a convincing impression of what 60,000,000 feet means. Please think of it as being more than a mere figure. It represents a history of human interest, of human effort, of persistent striving and planning towards the accomplishment of a definite hope.

That hope embodied the ambition to so well know our product and yours, our problems and yours, that sales built on deserved confidence would keep always ahead of any expansion in production. The accomplishment of that ambition, proven by our ability to market sueh an immense cut is itself proof that what we offer you as a buyer, not only in goods but in experience and serviee, could be used by you to your definite advantage. Have you some need through the serving of which we may earn from you also the privilege of sustained confidenee and friendly business relations? If you have such unfilled wants, may we know them?

SOUTHERN HARDWOODS, PANELS, CROSS BANDING, CORE STOCK

of

Golden Rule Quality

THE ANDERSON-TULLY COMPANY

MEMPHIS, TENNESSEE

Announcing Our Removal

—and Our New Home

WE wish to announce to our many customers and friends that we are now located in our new home—specially built to accommodate handling and storing of veneers—at 1100-1104 Queen Street West, Toronto.

We will be pleased to have you call on us at any time and inspect our large stock of veneers, where you can see the stocks.

As in the past we will carry a complete stock of American Walnut, Mahogany, Quartered Oak (in all thicknesses), Poplar and Figured Gum Veneers; also rotary-cut veneers, in all the popular woods.

Bigger Warerooms—Larger Stocks—Better Service.

SERVICE IS OUR WATCHWORD.

TORONTO VENEER COMPANY

1100-1104 QUEEN ST. WEST

TORONTO ONTARIO

MAHOGANY TEAK

Mahogany
VENEER and LUMBER
Fancy and Plain
In all
Thicknesses

Write me.

WALNUT

Walnut
LUMBER
and
VENEERS
Plain and Fancy

All Kinds of Fancy Woods

Lignum Vitæ
Spanish Cedar
Florida Cedar

BIRCH

Fancy and Plain
Glued-up Stock.

Grand Piano
Rim Stock in
Ash or Poplar

Pin Block Maple

Write for Prices.

"QUALITY"

Send me your inquiries.

GEORGE KERSLEY

224 St. James Street
MONTREAL

News of the Trade

The Magnet Toy and Novelty Company, Ltd., Port Hope, Ont., have obtained a charter.

The planing mill owned by the Peterboro Lumber Company, at Peterboro, Ont., has been totally destroyed by fire.

The C. E. Fleming Tie and Timber Company, Ltd., a lumber company recently incorporated at Ottawa, will operate a planing mill.

The Curtis, Wilson Furniture Company, Toronto, a retail concern, has dissolved. Mr. Curtis, one of the partners, will engage in manufacturing.

The Canadian Aeroplanes, Ltd., 1292 Dufferin Street, Toronto, have started work on an addition to their dry kiln. The owners are supervising the work.

The Bell Furniture Company, of Southampton, Ont., have recently installed a Canada special lumber-curing dry kiln, which they say is giving them excellent results.

The Harris Tie and Timber Company, Ltd., has been incorporated, with capital of $100,000. The business will be located at Ottawa, and the company will operate a planing mill.

The plant of the Stratford Chair Company, Stratford, Ont., was recently closed for a week while a new 300 h.p. engine was being installed, besides other needed repairs around the plant.

The Stratford Brass Bed Company, Stratford, Ont., have purchased the building recently occupied by the Fane & Hay Company. The company propose to extend their business and add to their present line spring wire mattresses.

The big new factory for the Keenan Woodenware Company, of Owen Sound, is rapidly nearing completion. It is expected that the roof will be on by the end of November, and that manufacturing operations will be started almost immediately.

The Imperial Munitions Board are said to have given out orders recently for a considerable quantity of 6 in. and 4.5 shell boxes. They are said to be substituting these orders for Bethlehem boxes wherever it is possible to make arrangements with firms having contracts for the latter.

La Manufacture de Seaux et Boites de Trois Rivieres, Limited, has been incorporated to manufacture and deal in tubs, pails, barrels, and boxes of all kinds; to manufacture lumber, logs, timber, pulpwood, and paper; to hold and operate mills, timber limits, etc. The capital is $99,000.

Dr. A. G. Doughty, Dominion Archivist, has just returned from overseas, and has brought with him a shipment of hand-carved toys made by Canadian soldiers during their convalescence in British hospitals. It is said that the most of these toys surpass the best models made by German toy-makers before the war. They will be placed in Canada's War Museum.

Robert Bury, Canada, Ltd., Toronto, have opened a branch office and storage warehouse at Beaumont Street, Montreal, in charge of Mr. W. R. Cockburn. The company are carrying at the branch very large stocks of veneers and also of lumber. The good-will and stock of the Dominion Mahogany and Veneer Company have been acquired by the company.

The Arnprior Cabinet Company, Ltd., a newly incorporated company, are having plans prepared for a factory to be built at Arnprior, Ont. The site has been purchased and comprises six acres. The company will manufacture cash register, filing and Victrola cabinets. The Beverley Wood Specialty Company, Ltd., of Toronto, are reported to be interested in this undertaking.

The George McLagan Furniture Company, Stratford, Ont., will manufacture a full line of Lyric phonographs. They are the sole Canadian makers of these machines, and, besides making the machines, will carry a complete catalogue of Lyric records. The manufacture of the machines is now well under way. The services of Mr. Russell L. Teeple, of Toronto, a phonograph expert, has been secured by the McLagan Company. Mr. Teeple will devote all his time to marketing and looking after the Lyric line.

One of the finishing machines made by the Paasche Air Brush Company, of Chicago, has been purchased for the Knechtel Furniture Company's plant at Walkerton, Ont. The machine has been in use now for several weeks, and Mr. Schwindt, the superintendent, says very good results are being obtained. This company has also installed within the last few weeks a jointing and ripping saw. This is a self-feed saw, and we are advised that it does the work of two hand-rippers, does the work better, and saves quite a bit of stock.

The plant of D. L. Shafer & Co., manufacturers of cedar chests, shirtwaist, and bedroom boxes, at St. Thomas, Ont., was recently damaged by fire. The total damage amounted to $5,000, and is covered by insurance. The company advise us that their main factory was damaged very little, and that they are running again, and hope to be able to fill all their Christmas orders without delay. This company is building a new brick kiln, which is rapidly nearing completion, and they hope in a week's time to be in a better position than ever to handle their work.

Babbitt Metals

By W. G. Harris, President Canada Metal Co., Toronto

(Continued from page 86)

perfect chemical affinity of the mixture. After being poured and before being passed into stock it is again tested for hardness by the Brinell method and on a friction testing machine, and the babbitt must stand up to all tests or it is discarded.

My experience has been gained during the last thirty years by studying all requirements, and whenever a difficult problem arose it was a pleasure to try and overcome same. Each problem was a step up the ladder of experience.

As babbitt metals by the Canada Metal Company are all made under such scientific principles a word as to how to obtain best results may be added as a guide to the machinists.

Pour the babbitt metal at as low a temperature as is consistent with the filling of the moulds.

Red hot metal is overheated and has a tendency to form a dense grain. Avoid red hot metal.

Stir well before pouring.

Keep metal pure and separate from others for best results.

Our babbitt metals may be poured indefinitely. They will not deteriorate.

When peening, strike in the centre, hitting lightly and work to the outside.

In pouring have riser and pour down on the shaft.

Do not tighten upper half of box hard until bearing is settled.

Heating the shell to from 100 degrees to 150 degrees C. before the babbitt is poured into it tends to prevent blow holes and similar defects, and also prevents the lining from shrinking away from the shell.

Babbitt bearings must not be jarred while the metal is solidifying, since any disturbance at this temperature tends to enlargement of the crystals and corresponding brittleness.

The Bennett Lumber Co. Limited

Solicit your enquiries for

Mahogany, Walnut, Oak, Poplar, Gum

and all other American HARDWOODS in all grades and thicknesses.

CANADIAN SPRUCE, PINE and BIRCH LUMBER

Long Distance Phone Main 812 — 11 St. Sacrement St. MONTREAL, P.Q.

E. H. Shreiner Lumber Company

EXCLUSIVELY WHOLESALE

Band Mill—West Salisbury, Pa.

General Offices—PITTSBURGH, Pa.

7 cars 8/4 Sound Wormy Chestnut

Band sawed, West Va. Stock

SPECIAL

Watch this space each month for Specials.

HIGH-CLASS MADE-IN-CANADA

AIR COMPRESSORS

Send us your Inquiries

HAMILTON MOTOR WORKS, LIMITED

HAMILTON CANADA

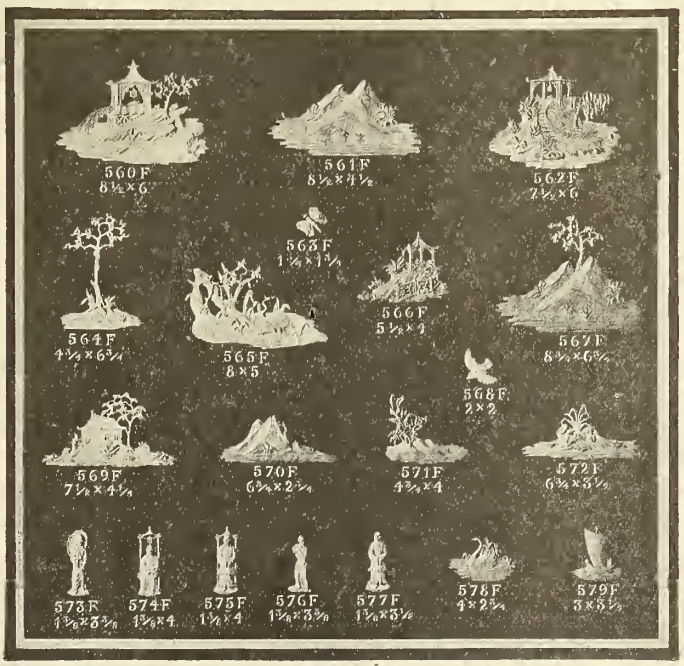
CARVINGS FOR PERIOD FURNITURE

Composition Carvings

are now extensively used for furniture decorations.

This is a material that will interest all manufacturers of furniture.

Write for Catalog and prices.



Most durable and practical Carvings on the market.

We have thousands of stock designs in all the different styles; can also manufacture according to your special designs.

Samples sent on request.

DECORATORS SUPPLY CO., Archer Ave. and Leo St., Chicago, Ill.

WANTED

Heavy used 54 in. or 60 in. Band Resaw, capable of handling large timbers. Give name of maker, condition, age, where located and price. Box 40, Canadian Woodworker, Toronto, Ont.

FOR SALE
BOX MACHINERY

One dovetail machine.
One setting up machine.
One four saw trimmer—self feeding, made by Dovetail Machine Co., St. Paul, Minn.
One No. 22 Box trimmer, made by Fisher Machine Works, Chicago, Ill.

All cost $3,300; will guarantee and sell at a bargain. Inquire of The Globe Soap Company, Cincinnati, Ohio.

Machinery For Sale

Acting on instructions from the assignees we have for sale the balance of the machinery equipment of a large Box Factory in Winnipeg. Also we have many other special woodworking tools to dispose of. The following is a partial list:—

4 Power Feed Rip Saws.
1 American Combination Saw and Dado Machine
1 C. M. C. Tilting Table Saw.
1 Cowan Tilting Table Saw.
1 McGregor-GourlayTilting Table Saw
2 Cowan N-255 Chain Saw Mortisers
1 New Britain No. 7 Chain Saw Mortiser.
1 New Britain No. 2 Chain Saw Mortiser.
1 Set Beach Boxmakers Saws.
1 Set Cowan Boxmakers Saws.
1 Berlin 54 in. No. 289 Band Resaw.
1 Berlin H-471 Glue Jointer
1 Outfit Band Resaw Fitting Machinery
1 Emery Grinder on Pedestal
1 Robinson Band Saw Setting Machine
1 Dowel Machine with six heads
1 Cowan Horizontal Band Resaw ((Hopper Feed)
1 Nichols Arm Sander (American)
2 Turning Lathes
1 McGregor-Gourlay 24 in. Planer and Matcher
1 McGregor-Gourlay Double Spindle Shaper
6 Sections Cowan Veneer Press 12 in. x 38 in.
1 McGregor-Gourlay 16 in. Buzz Planer
1 Cowan 24 in. Buzz Planer
1 Cowan M-210 Double Surfacer
1 Hespeler 10 ft. Belt Sander.
1 Schinnel-Reid 8 ft. Belt Sander
1 Greenlee Sash Relisher & Hollow Chisel Mortiser
1 Outfit Morgan Lock Corner Machinery
1 A.B.C. Planing Mill Exhauster and Piping, 60 in. Single
1 30 in. Single Planing Mill Exhauster
1 60 in. Double A.B.C. Planing Mill Exhauster and Piping
1 60 in. Columbia Sander
1 set Hayes Dowel Door Machinery
4 Heavy Moulders
3 Sash Stickers
1 Pony Planer
1 Upright Chisel Mortiser
1 Locomotive Boiler 25 to 30 H.P., complete with stack
1 Lighting Outfit, Engine, Generator and Panel (150 lights)
1 "Murray" Corliss 18 in. x 36 in.
1 "Atlas" Corliss 125 h.p.
2 Motors, 30 H.P., 1120 R.P.M.
Large quantity Shafting, Pulleys and Hangers.

For prices write

J. L. Neilson & Co.

t.f. **Winnipeg, Man.**

FOR SALE

One 10 H.P. Fuller & Johnson Gasoline Engine, first-class condition; price $175.00. Foster Bros., Tomahawk, Wis.

FOR SALE

200,000 ft. 1 x 4 and up Mill Run Spruce

The Elgie & Jarvis Lumber Co., Ltd.

18 Toronto Street, Toronto, Canada.

Cost Accountant

ineligible for Overseas Service, having had four years' experience in Mill Work Costs, and an additional three years as an assistant with one of the foremost Accounting firms of Canada, desires a position where he can control and operate the cost accounts of a large woodworking and contracting concern. Good references.

Mr. Howe, 1401 Royal Bank Bldg., Toronto.

WANTED

A first-class energetic resourceful manager for a new, well-equipped chair plant in a good live furniture town, advantageously situated.

One who understands the business from the ground up, and who can take full charge of manufacturing.

A good opportunity for ability to display itself. A man who can associate himself with a concern financially preferred. Apply Box 28, Canadian Woodworker, Toronto, Ont.

DRY LUMBER FOR SALE

135,000 ft. 1 x 12—12/16 ft. White Pine.
200,000 ft. 1 x 4 and up, 6/11 ft. Mill Run White Pine.
200,000 ft. 1 x 4 and up, No. 2 White Pine Mill Cull.
200,000 ft. 1 x 10/12 in. No. 1 White Pine Mill Cull.
200,000 ft. 1 x 4 and up, No. 1 White Pine Mill Cull.

The Elgie & Jarvis Lumber Co., Ltd.

18 Toronto St., Toronto, Canada.

Woods Like Mahogany

Many woods from the various tropical regions of the world are sold as mahogany, but those to which the name does not rightfully belong are found by the United States Department of Agriculture to include as many as sixty-seven species of trees, of forty-one genera, scattered through eighteen families of the vegetable kingdom. True mahogany is the wood of two closely related species which grow naturally only from the tropical part of Florida and adjacent keys and islands to Northern South America. Even true mahogany has many grades, and local varieties vary in weight.

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The only unlimited System.
Patrol clock, each $39.60 complete.
Stations, any number needed $4.10.
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PETRIE'S OCTOBER LIST
of
NEW and USED
WOOD TOOLS
in stock for immediate delivery

Wood Planers
30" Whitney pattern surfacer.
26" double surfacer.
24" Single surfacers, various makes.
24" Champion planer and matcher.
16" Canada Mach. Corp. pony planer.
15" Woods planer and matcher.

Band Saws
28" Ballantine, bracket.
26" Crescent pedestal (2).

Saw Tables
No. 3 Crescent, universal.
No. 5 Crescent, sliding top (2).
Ballantine variable power feed.
No. 257 Berlin power-feed rip.
12' Defiance automatic equalizer.
MacGregor Gourlay railway cut-off.
Greenlee automatic cross-cut.
Canadian steel frame pole saw.
5½' Crescent, swing.

Mortisers
Cowan hollow chisel, M190.
Galt upright, compound table.
No. 5 New Britain, chain.
No. 2 Smart foot power.

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13" Clark-Demill four-side.
12" Cowan four side.
12" Woods four-side.
10" Houston four side.
8" Dundas four-side.
6" Cowan four side.
6" Dundas sash sticker.

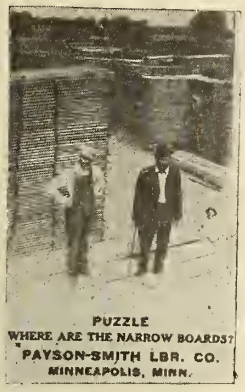
Sanders
24" Fay double drum.
12" C.M.C. disk and drum.
18" Crescent disk

Clothespin Machinery
Humphrey No. 8 giant slab resaw.
Humphrey gang slitter.
Humphrey cylinder cutting-off machine.
Humphrey automatic lathes (6).
Humphrey double slotters (4).

Miscellaneous
Elliot universal woodworker, with motor.
Fay & Egan 12 spindle dovetailer.
MacGregor Gourlay 12 spindle dovetailer.
Cowan dowel machine, M80.
No. 1 Ballantine dowel machine.
Cowan post boring machine, M85G.
Crescent post boring machine.
Egan sash and door tenoner.
Dundas double-head tenon machine.
Cowan sash clamp, M137.
No. 4A Fox wood trimmer.
Dougherty horizontal shingle machine.
Waterous lath machine.
26" Dominion lath trimmer.
MacGregor-Gourlay 2-spindle shaper.
Defiance shovel handle shapers
48" 3 saw edger.
20" American wood scraper.
3" Pringle & Brodie variety wood lathe.
4-head rounding machines.
Cowan spindle carver, M63.
No. 1 Hart automatic saw filer.
No. 104 Covel band-saw roller.

Prices, Descriptions and Full Particulars on Request

H. W. PETRIE, LTD.
Front St. W., Toronto, Ont.



Dry Hardwoods

4 cars 3/4 No. 1 Com. and Bet. Plain Red Oak.
5 cars 3/4 No. 1 and 2 Common Plain Red Oak.
10 cars 4/4 No. 1 Common Plain Red Oak.
5 cars 4/4 No. 2 Common Plain Red Oak.
5 cars 4/4 F.A.S. Plain White Oak.
5 cars 4/4 No. 1 Common Plain White Oak.
5 cars 4/4 No. 2 Common Plain White Oak.
5 cars 6/4 No. 1 Com. and Bt. Plain White Oak.
5 cars 8/4 No. 1 Com. and Bt. Plain White Oak.
3 cars 8/4 No. 2 Common Plain White Oak.
2 cars 4/4 F.A.S. Quartered White Oak.
2 cars 4/4 No. 1 Common White Oak.
6 cars 6/4 F.A.S. White Oak.

We also have a fine stock of Northern Hard Maple, Birch, Basswood, etc.

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C. DUPRÉ & CO.

LIMITED

266 King St. West - TORONTO

We Carry Stock of

Three Ply Panels

— IN —

FIR
BIRCH
PLAIN OAK
QUARTERED OAK
MAHOGANY

Send Us Your Inquiries or Phone Adelaide 1379

Please examine this list of Hardwoods

1 car 4/4 in No. 3 Com. Black Ash.
3 cars 4/4 in. No. 2 Com. and Btr. Black Ash.
3½ M. 6/4 in. No. 1 Com. and Btr. Black Ash.
4 cars 4/4 in. No. 3 Com. Birch.
1 car 6/4 in. No. 1 Com. and Btr. Birch.
1 car 8/4 in. No. 1 Com. and Btr. Birch.
3 cars 4/4 in. No. 2 Com. and Btr. Basswood.
1 car 4 x 6 in. Birch and Maple Hearts.
2 cars 8/4 in. No. 2 Com. and Btr. Birch and Maple (about 80 per cent. Birch).
2 cars 4/4 in. No. 3 Com. and Btr. Soft Elm.
2 cars 8/4 in. No. 1 Com. and Betr. Soft Elm.
1 car 12/4 in. No. 1 Com. and Btr. Soft Elm.
1 car 5/4 in. No. 2 Com. and Btr. Hard Maple.
3 cars 6/4 in. No. 2 Com. and Btr. Hard Maple.
2 cars 8/4 in. No. 2 Com. and Btr. Hard Maple.

Guaranteed not over 10 per cent. No. 2 Com. in last three items.

All dry stock and nicely manufactured

We should like to quote you

Graves, Bigwood & Co.

Manufacturers of

PINE
HEMLOCK
HARDWOOD } **LUMBER**

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MONTREAL OFFICE:
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and
Deer Lake, Ont.

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As usual, we have a large and varied assortment of all that is

NEW and BEST

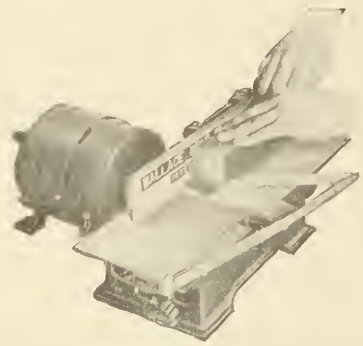
in every grade and style of Furniture Hardware.

Get our Samples.

THE BURNS & BASSICK COMPANY

Division of

Bridgeport THE BASSICK COMPANY **Connecticut**



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is the Powerful Little Machine which will increase your output and decrease your costs. Should be used in every Pattern, Cabinet, and Woodworking Shop.

Either Motor or Belt Driven.
Write us for Price and Circular

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THE FOSS & HILL MACHINERY CO.
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Safety Cylinder Heads

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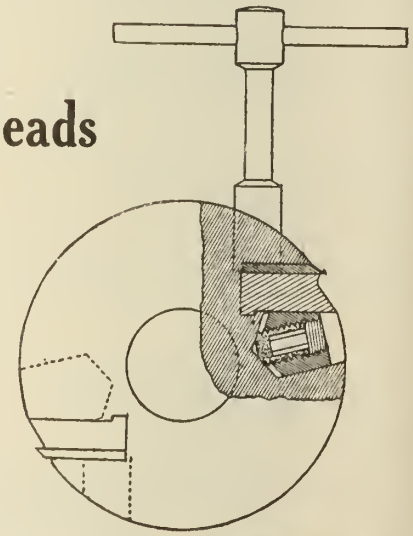
Jointers

and

Shapers

Two and Four Knife Heads



GUSTAFSON and SCOTT MFG. CO.
(Not incorporated)
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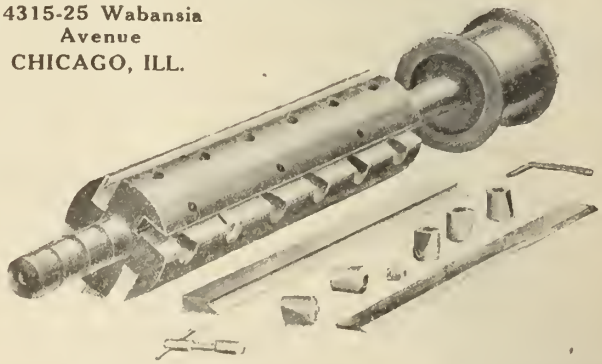
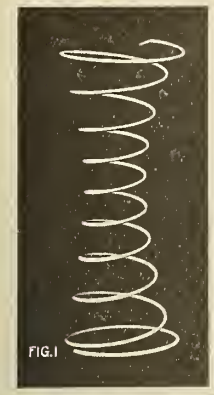
CHICAGO, ILL.





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"The Line of Dependability"

We cover the entire field of upholstery requirements. Our long experience in spring making enables us to render you a valuable service in expert advice and we solicit an opportunity to aid you in working out your problems. Our facilities insure a prompt and careful execution of your order.

We are furnishing high grade goods at best values in furniture springs, pillow springs, single cone springs and helicals.

Constructions for chairs, rockers, davenports and settees.

The Luxury Spring for filling of top cushions over Foster Springs or constructions is the "Ideal" combination.

We solicit your inquiries

FOSTER BROS. MFG. CO., Utica, N.Y., U.S.A.

SHELL BOX WIRES

Let us supply you with these wires, with looped ends, bent to fit the box, ready for nailing, with staples included.

Our equipment will enable us to supply you any quantity on short notice. Perfect quality. All alike

WE ARE MANUFACTURERS OF

Wire and Wire Products

Bale ties, Heading ties, Lath ties, Hardwood Flooring ties, Wire Nails, Flat Steel or Wire Barrel hoops. All sizes of Fine wire in Bright, Tinned or Galvanized, manufactured to order.

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A. T. Diggins, Toronto, Ont. H. E. O. Bull, Montreal, Que.
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Head Office and Works: Hamilton, Canada

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Brass Pulls—all the period designs, Desk Pulls, Label Holders, Card Index Rods, Hat Hooks, Desk Slides, Brass Sockets, Sliding Casters, etc.

Talking Machine Hardware

Lid Supports, Needle Cups, Needle Rests, Door Catches, Continuous Hinges, Sockets, Sliding Casters, Tone Rods, Knobs, etc.

Trimmings for Smokers' Stands

Weber-Knapp Company
Jamestown, N. Y.

"ENAMELS"

Our business in both White and Old Ivory Enamels and Primers has trebled during the past year

WHY?

They are the best on the market. If you are not using them, write for samples and prices.

The
Ault & Wiborg Co. of Canada, Ltd.
Varnish Works

Montreal Toronto. Winnipeg

Peter Hay Machine Knives

Peter Hay knives are made of special quality steel tempered and toughened to take and hold a keen cutting edge. Hay knives are made for all purposes.

Have you our Catalogue?

Made in Canada

The Peter Hay Knife Co., Limited
GALT, ONTARIO

DUST SEPARATORS
100% EFFICIENCY

The Toronto Blower Co. will send an expert Engineer of extended experience to view Plants where the installation of Exhaust Systems are contemplated.

Slow Speed, Low Power
EXHAUST SYSTEMS
WITH THE
"FOSTER" FAN

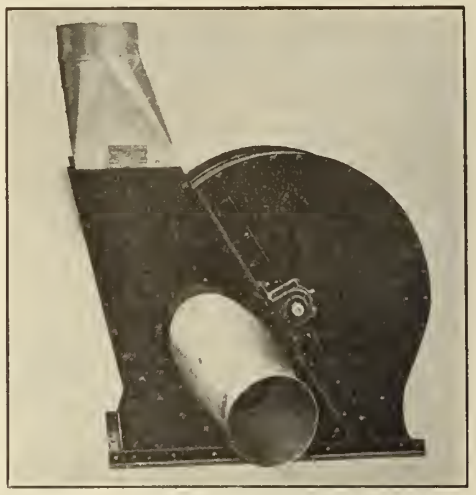
We manufacture a complete line of Fans, Galvanized Iron Pipe, Dust Collectors, Auto-Furnace Feeders, Hoods for Wood-Working Machines, Buffing and Polishing Wheels.

Exhaust Systems a Specialty.

Years of practical experience.

Correctness of design is the most important factor in the construction of an Exhaust System.

Protect your workman.



Note the inlet opening.

It is so placed that air and material is immediately discharged without being carried around fan-wheel. There are two ball-bearings on pulley side of case and one on inlet side.

Efficient fan with minimum power.

Toronto Blower Company
156 Duke Street, Toronto

The Elliot Woodworker

There are Over One Thousand Satisfied Users.

Can You afford to be without one?

This is a back view of our No. 5 woodworker, showing jointer running direct from motor-pulley. At the same time, rip-saw can be cutting lumber up to 5 inches thick.

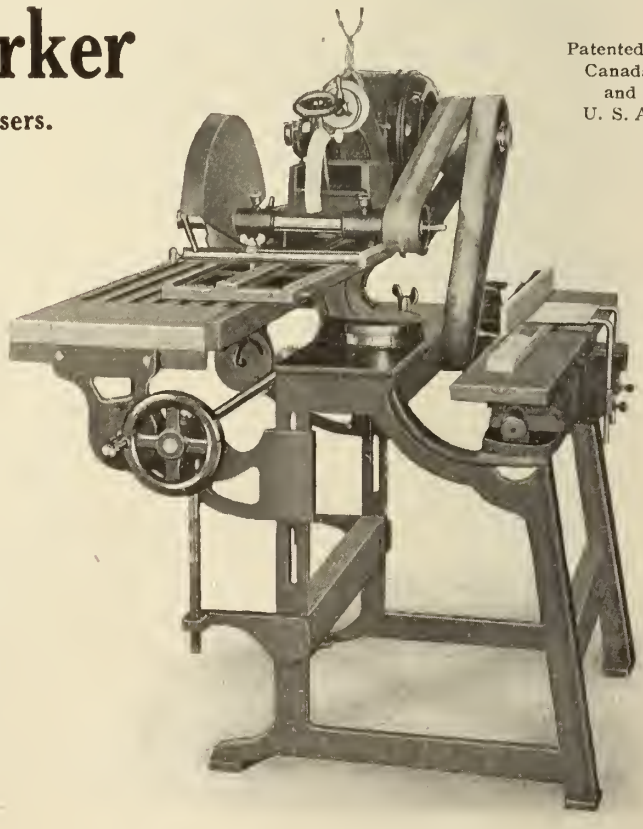
By removing jointer-belt, the slide is swung around and can be set instantly to mitre any degree, or dado door and window frames, cupboards, house your stair-strings, run mouldings, bore, groove, plow, cut, foot, and plumb, and side cuts of jack-rafters.

This machine is being adopted by the Brooklyn Navy Yards, the Norfolk Navy Yards (where we have delivered three machines in the last month), the West Point Military Academy, and other United States Government Works.

It will stand up to the heaviest duty required. It is a great money-saver to the user. Now is the time to save 25 to 30 per cent. on your carpenter work.

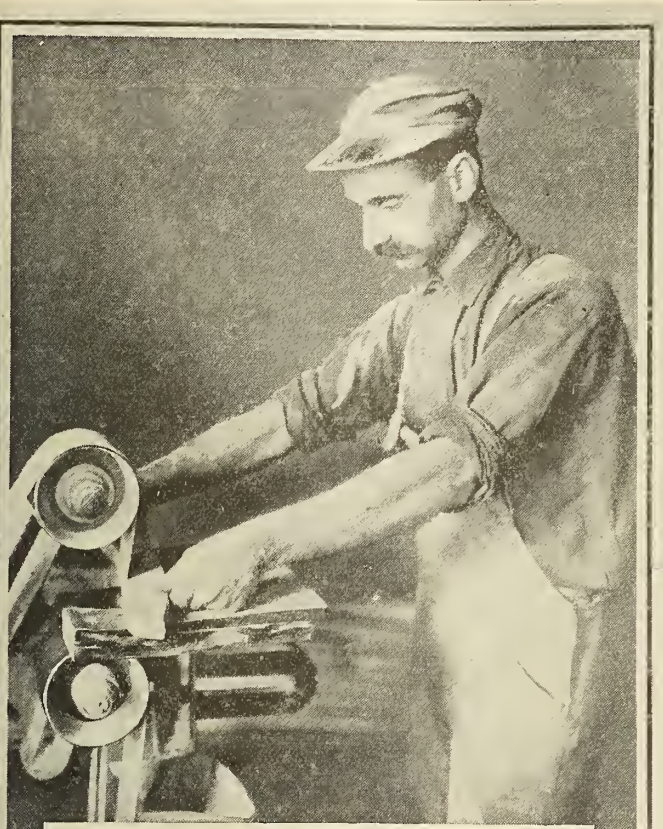
Write at once for further information and terms.

If in Toronto, take College or Bathurst Street cars and see machine operated.



Patented in Canada and U. S. A.

Elliot Woodworker, Limited
Office and Factory
College and Bathurst Streets - TORONTO
Phone College 1496



INCREASED production and greater economy in your sanding department can be obtained by using

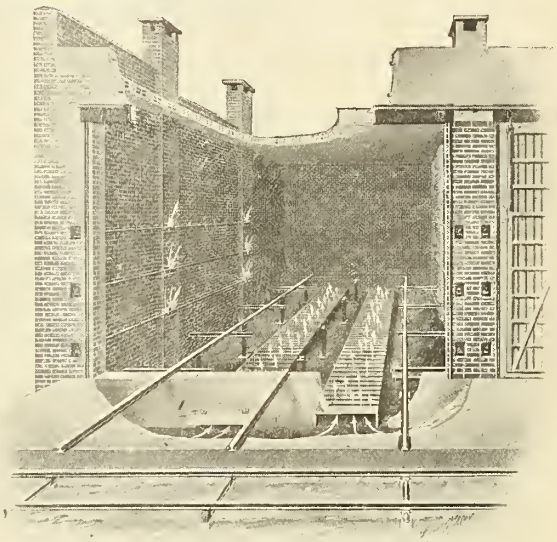
CARBORUNDUM BRAND GARNET PAPER AND CLOTH

They show a saving in labor, quicker production and better results. Carborundum Brand Garnet Paper and Cloth is made from the best garnet grains. Free from all impurities. Uniformly coated upon flexible backings. The best materials united with superior methods of manufacture make Carborundum Brand Garnet Paper and Cloth the ideal abrasive for the woodworking trade.

Working samples upon request

THE CARBORUNDUM COMPANY
NIAGARA FALLS, N. Y.
New York Chicago Grand Rapids
Boston Cincinnati

The war is not boosting our prices. We got ready for these troublous times.

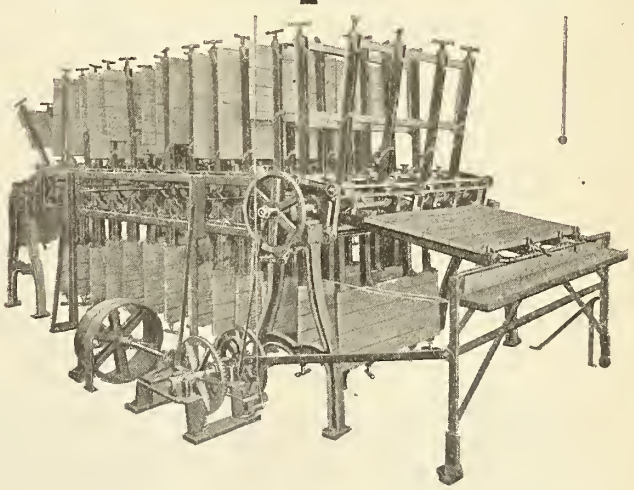


In spite of the fact that we have never had so much business, we are still in shape to serve you at reasonable prices.

GET OUR QUOTATIONS

THE NATIONAL DRY KILN CO.
1117 East Maryland St., INDIANAPOLIS, Indiana

Do You Handle Glued-up Stock?



If you do, here is a machine that will save you 60% of the time and labor required to handle your work with hand clamps. This machine is the Billstrom Automatic Glue Clamp Carrier.

EXAMINE THE ILLUSTRATION

Nels J. Billstrom, 2002 Ninth Street, ROCKFORD, ILL.
R. S. Pollard, Preston, Ont., Canadian Sales Agent

The "Canadian Woodworker" Buyers' Directory

An Index to the Best Equipment and Supplies

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Paasche Air Brush Company, Chicago, Ill.

AIR COMPRESSORS
Hamilton Motor Works, Hamilton, Ont.

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Canada Metal Company, Toronto, Ont.
Hoyt Metal Co., Toronto.

BALL BEARINGS
Chapman Double Ball Bearing Co., Toronto.

BALUSTER LATHES
Garlock-Walker Machinery Co., Toronto, Ont.
Mattison Machine Works, C., Beloit, Wis.
Whitney & Son, Baxter D., Winchendon, Mass.

BAND SAW FILING MACHINERY
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Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Preston Woodworking Machinery Company, Preston, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

BAND SAWS
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Cowan & Co., Galt, Ont.
Disston & Sons, Henry, Inc., Philadelphia, Pa.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

BAND SAW MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Yates Machine Co., P. B., Hamilton, Ont.

BENDING MACHINES
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
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Perfection Wood Steaming Retort Company, Parkersburg, W. Va.

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Sadler & Haworth, Montreal, Que.

BENCH PLANERS
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Sheldons, Limited, Galt, Ont.
Toronto Blower Co., Toronto, Ont.

BLOW PIPING
Sheldons, Limited, Galt, Ont.

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Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mereen-Johnson Mach. Co., Minneapolis, Minn.
Nash, J. M., Milwaukee, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Reynolds Pattern & Machine Co., Moline, Ill.
Yates Machine Co., P. B., Hamilton, Ont.

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Laidlaw Bale-Tie Co., Hamilton, Ont.

BOX MAKERS' MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mereen-Johnson Machine Company, Minneapolis, Minn.
Neilson & Company, J. L. Winnipeg, Man.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

CABINET PLANERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Hall & Brown Machinery Co., St. Louis, Mo.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

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Sheldons, Limited, Galt, Ont.

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Carborundum Co., Niagara Falls, N.Y.

CARVING MACHINES
Canada Machinery Corporation, Galt, Ont.
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Garlock-Walker Machinery Co., Toronto, Ont.
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Onward Mfg. Company, Kitchener, Ont.
Schmidt, F. A., Kitchener, Ont.

CHAIR MACHINERY
McKnight & Son Co., L. G., Gardner, Mass.

CLAMPS
Batavia Clamp Company, Batavia, N.Y.
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Neilson & Company, J. L., Winnipeg, Man.
Preston Woodworking Machinery Company, Preston, Ont.

COLUMN MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

CORRUGATED FASTENERS
Acme Steel Goods Company of Canada, Ltd.

CRATING LUMBER
Read Bros., Limited, Toronto.

CUSTOMS TURNINGS
Galbraith & Co., Ltd., Owen Sound, Ont.

CUT-OFF SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

CUTTER HEADS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Gage Mfg. Company, E. E., Gardner, Mass.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, Beloit, Wis.
Shimer Cutter Head Co., Galt, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

DOVETAILING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

DOWEL MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

DOWELS
Toy Products Co. of Canada, Farm Point, Que.

DRY KILNS
Grand Rapids Veneer Works, Grand Rapids, Mich.
National Dry Kiln Co., Indianapolis, Ind.
Sheldons, Limited, Galt, Ont.

DUST COLLECTORS
Sheldons, Limited, Galt, Ont.

DUST SEPARATORS
Sheldons, Limited, Galt, Ont.

EDGERS (Single Saw)
Canada Machinery Corporation, Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont
Radcliff Saw Mfg. Co., Toronto, Ont.

EDGERS (Gang)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Williams Machinery Co., A. R., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

END MATCHING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

EXHAUST FANS
Canadian Blower & Forge Co., Kitchener, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Sheldons, Limited, Galt, Ont.
Toronto Blower Company, Toronto, Ont.

FEED ATTACHMENTS
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.

FILTER OILS
Nugent & Co., Wm. W., Chicago, Ill.

FLOORING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

FLUTING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.

FLUTING AND TWIST MACHINE
Preston Woodworking Machinery Company, Preston, Ont.

FURNITURE CARVINGS
Decorators Supply Co., Chicago, Ill.

FURNITURE LEATHER
Boulee Fraser Leather Co., New York.
Eagle-Ottawa Leather Co., Grand Haven, Mich.
Schmidt, F. A., Kitchener, Ont.

FURNITURE TRIMMINGS
Burns & Bassick Co., Bridgeport, Conn.
Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.
Noblit Bros. & Company, Philadelphia, Pa.
Schmidt, F. A., Kitchener, Ont.
Weber Knapp Co., Jamestown, N.Y.

GARNET PAPER AND CLOTH
The Carborundum Co., Niagara Falls, N.Y.

GRAINING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Yates Machine Co., P. B., Hamilton, Ont.

Morehead

Back to Boiler SYSTEM

Read What The Wabash Cabinet Co. Say!

"With reference to the Morehead Trap, it is everything that Mr. McLachlan said it was. Before we made this change, our watchman was obliged to put in coal every fifteen minutes. Now he puts in a fire on an average of once every hour and WE ARE SAVING OVER 50 PER CENT. ON THE COST OF OUR FUEL."

You can do the same, The first step is to

Write for the "Back-to-Boiler" Book

In it you will find the condensation question discussed from several angles—and interesting pictures of installations under every possible condition.

The economic principle of the "Morehead" System will save you dollars. Write for the book TO-DAY.

Canadian Morehead Mfg Co.

Woodstock Dept. "H" Ontario

GRAND RAPIDS VAPOR DRY KILN

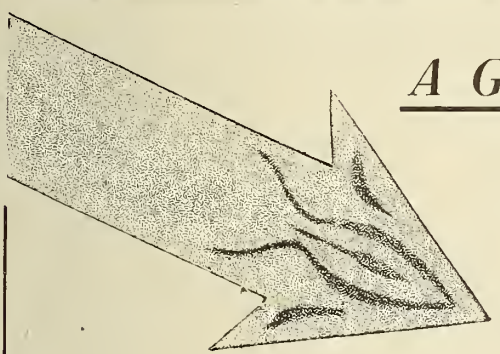
GRAND RAPIDS MICHIGAN

Increasing output of other kilns is part of our business.

We can arrange to utilize your present equipment and supplement with sufficient additional to bring your kilns to our basis of output.

We would suggest that you supply our engineering department with description of your kilns and lumber drying needs, so we can understandingly outline what can be done.

Your opening the matter will incur no obligation and we will give you, frankly, the results of our experience.



A Good Point to Remember—

ALWAYS SPECIFY

"FROST KING" BABBITT METAL

For high-speed machinery and engine work, Frost King Babbitt Metal is, we believe, without an equal. It is especially designed for Saw Mills, Planing Mills, Threshing Machines, Traction Engines, Pumps, Rolling Mills, and Pulp Machinery, and all classes of STATIONARY Engines.

Thirty-five years' experience in selecting and compounding of stock means that our products are of very high quality, and that they will completely satisfy.

TROJAN BABBITT is our new product especially designed for over-head bearings in line and countershafts, and will be found an excellent babbitt for use in Furniture Factories, Planing Mills, etc., where there are numerous bearings in out of the way places.

A trial of both will convince you of their good qualities.

HOYT METAL COMPANY

TORONTO ONTARIO

Also at

NEW YORK ST. LOUIS LONDON, Eng.

"Canadian Woodworker" Buyers' Directory—Continued

GLUE
Perkins Glue Company, South Bend, Ind.

GLUE CLAMPS
Batavia Clamp Company, Batavia, N.Y.
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Neilson & Company, J. L., Winnipeg.

GLUE HEATERS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Kitchener, Ont.

GLUE JOINTERS
Canada Machinery Corporation, Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

GLUE SPREADERS
Fay & Egan Co., J. A., Cincinnati, Ohio
Jackson, Cochrane & Company, Kitchener, Ont.

GLUE ROOM EQUIPMENT
Billstrom, Nels. J., Rockford, Ill.
Perrin & Company, W. R., Toronto, Ont.

GRINDERS (Cutter)
Fay & Egan Co., J. A., Cincinnati, Ohio
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.

GRINDERS, HAND AND FOOT POWER
The Carborundum Co., Niagara Falls, N.Y.

GRINDERS (Knife)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

GRINDERS (Tool)
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Kitchener, Ont.

GRINDING WHEELS
The Carborundum Co., Niagara Falls, N.Y.

GROOVING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Mattison Machine Works, C., Beloit, Wis.

GUARDS
Gustafson & Scott Mfg. Co., Chicago, Ill.

GUM LUMBER
Anderson-Tully Co., Memphis, Tenn.
Brown & Co., George C., Memphis, Tenn.
Churchill-Milton Lumber Co., Louisville, Ky.
Thomas & Proetz Lumber Co., St. Louis, Mo.

GUMMERS, ETC.
Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND PROTECTORS
Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND SCREWS
Fay & Egan Co., J. A., Cincinnati, Ohio.

HANDLE & SPOKE MACHINERY
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Whitney & Son, Baxter D., Winchendon, Mass.

HARDWARE
Acme Stamping & Tool Works, Hamilton, Ont.
Burns & Bassick Co., Bridgeport, Conn.
Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.
Laidlaw Bale-Tie Co., Hamilton, Ont.
Schmidt, F. A., Kitchener, Ont.
Weber-Knapp Co., Jamestown, N.Y.

HARDWOOD LUMBER
American Hardwood Lumber Co., St. Louis, Mo.
American Oak Mfrs.' Assn., Memphis, Tenn.
Anderson-Tully Co., Memphis, Tenn.
Atlantic Lumber Company, Toronto.
Banning, Leland G., Cincinnati, Ohio.
Barr-Holaday Lumber Co., Greenfield, Ohio.
Bennett Lumber Co., Montreal, Que.
Brown & Company, Geo. C., Memphis, Tenn.
Burns & Knapp Lumber Co., Conneautville, Pa.
Bury & Company, Robert, Toronto, Ont.
Churchill-Milton Lumber Co., Louisville, Ky.
Clark & Son, Edward, Toronto, Ont.
Dermott Land & Lumber Co., Chicago, Ill.
Felger Lumber and Timber Co., Grand Rapids, Mich.
Graves, Bigwood Company, Toronto, Ont.
Gregertson Bros. Co., Chicago, Ill.
Kentucky Lumber Co., Lexington, Ky.
Kersley, Geo., Montreal, Que.
Korn-Conkling Co., Cincinnati, Ohio.
Martin-Barriss Co., Cleveland, Ohio.
McLennan Lumber Co., Montreal, Que.
Nicholson & Co., E. M., Montreal.
Paepcke Leicht Lumber Co., Chicago, Ill.
Payson Smith Lumber Co., Minneapolis, Minn.
Penrod, Jurden & McCowen, Memphis, Tenn.
Penrod Walnut & Veneer Co., Kansas City.
Pickrel Walnut Co., St. Louis, Mo.
Probst Lumber Co., Cincinnati, Ohio.
Read Bros., Limited, Toronto.
Shiels & Company, Chas. F., Cincinnati, Ohio.
Spencer, C. A., Montreal, Que.

HUB MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
Hydraulic Machinery Company, Montreal, Que.
Perrin & Company, Wm. R., Toronto, Ont.

INCANDESCENT LAMPS
Canadian Laco Philips Co., New York and Toronto.

JOINTERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Williams Machinery Co., A. R., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

KNIVES (Planer and others)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

LATHES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Defiance Machine Works.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Foss & Hill Machinery Company, Montreal.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.

LUMBER
Aberdeen Lumber Co., Pittsburg, Pa.
Acme Veneer & Lumber Co., Cincinnati, Ohio.
American Hardwood Lumber Co., St. Louis, Mo.
Anderson-Tully Co., Memphis, Tenn.
Banning, Leland G., Cincinnati, Ohio.
Barr-Holaday Lumber Co., Greenfield, Ohio.
Bennett Lumber Co., Montreal, Que.
Brown & Company, Geo. C., Memphis, Tenn.
Churchill, Milton Lumber Co., Louisville, Ky.
Clark & Son, Edward, Toronto, Ont.
Dermott Land & Lumber Co., Chicago, Ill.
Dupre & Company, Toronto, Ont.
Felger Lumber and Timber Co., Grand Rapids, Mich.
Graves, Bigwood Company, Toronto, Ont.
Hartzell, Geo. W., Piqua, Ohio.
Huddleston, Marsh Mahogany Co., New York.
Korn-Conkling Company, Cincinnati, Ohio.
Long-Knight Lumber Co., Indianapolis.
McLennan Lumber Co., Montreal, Que.
Nicholson & Co., E. M., Montreal.
Paepcke Leicht Lumber Company, Chicago, Ill.
Payson Smith Lumber Co., Minneapolis, Minn.
Pickrel Walnut Co., St. Louis, Mo.
Probst Lumber Co., Cincinnati, Ohio.
Read Bros., Limited, Toronto.
Shreiner Lumber Co., Pittsburgh, Pa.

MACHINE KNIVES
Canada Machinery Corporation, Galt, Ont.
Peter Hay Knife Company, Galt, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

MITRE MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

MITRE SAWS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.

MULTIPLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.

NITROGEN LAMPS
Canadian Laco Philips Co., New York and Toronto.

OILERS—SHAFT
Nugent & Co., Wm. W., Chicago, Ill.

OILING DEVICES
Nugent & Co., Wm. W., Chicago, Ill.

OILING SYSTEMS
Nugent & Co., Wm. W., Chicago, Ill.

PANELS
Wactjen & Co., George L., Milwaukee, Wis.

PATTERN SHOP MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PERIOD CARVINGS
Walter & Sons, J., Kitchener, Ont.

PERIOD MOULDINGS
Waddell Mfg. Co., Grand Rapids, Mich.

PLANERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Wallace & Company, Chicago, Ill.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PLANING MILL MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Foss & Hill Machinery Company, Montreal.
Garlock-Walker Machinery Co., Toronto, Ont.
Hall & Brown Machinery Co., St. Louis, Mo.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

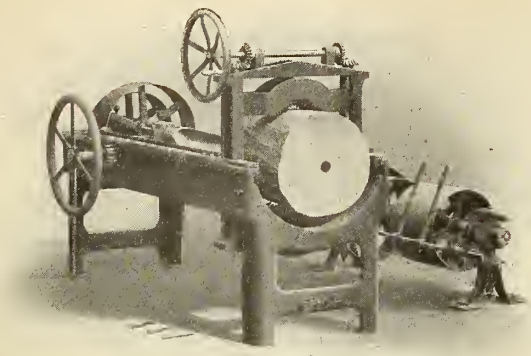
PRESSES (Veneer)
Canada Machinery Corporation, Galt, Ont.
Hydraulic Machinery Company, Montreal, Que.
Jackson, Cochrane & Company, Kitchener, Ont.
Perrin & Co., Wm. R., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.

PULLEYS
Dodge Mfg. Company, Toronto, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

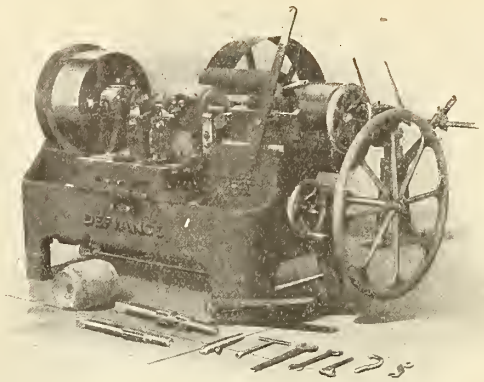
RED GUM LUMBER
Gum Lumber Manufacturers' Association.

RECORDERS (TIME)
International Time Recording Co., Toronto, Ont.
Signal Systems, Limited, Toronto, Ont.

RESAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.



No. 1 Heavy Hub Boring Machine



No. 1 Hub Lathe

HUBS FOR VEHICLE WHEELS

There is no longer any argument against high productive machinery being in greater need than ever before. Practically every nation in the world is, at this time, demanding greater production of its factories, which, with labor becoming less available every day, leaves high productive machinery as the only recourse of rescue to industry.

Defiance High Productive Wheel Making Machinery

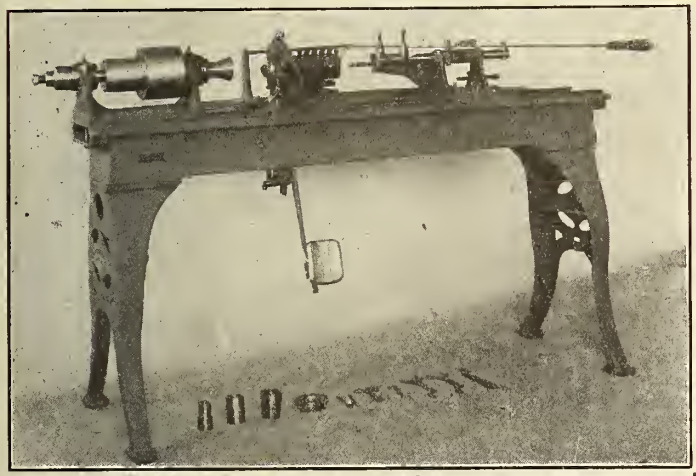
is serving wheel manufacturers everywhere throughout the world. It is a proven success, so pronounced and so continued as to leave no reasonable doubt in the mind of the purchaser of its superior merit.

It is made to perform with speed and accuracy every operation necessary to make hubs, spokes, and rims of every description, and to assemble such wheels as are used for artillery, automobiles, trucks, wagons, and carriages.

Write for illustrated and descriptive matter on your requirements in wheel-making machinery to

THE DEFIANCE MACHINE WORKS

New York City **DEFIANCE, OHIO, U.S.A.** **London, Eng.**



Many Points of Superiority

are embodied in the

WAYMOTH VARIETY WOOD-TURNING LATHE

This machine in one operation turns, bores and cuts off wood turnings in any size up to 34 inches in length.

It embodies many improvements. There is an arrangement whereby all side motion occasioned by the continual wear of the tail-stock and middle-piece is taken up; by the use of a patent rougher bed a knife is used 10 inches long instead of one about 2 inches, as formerly; a rack and gear is used instead of a stud and crank for operating the swing bed.

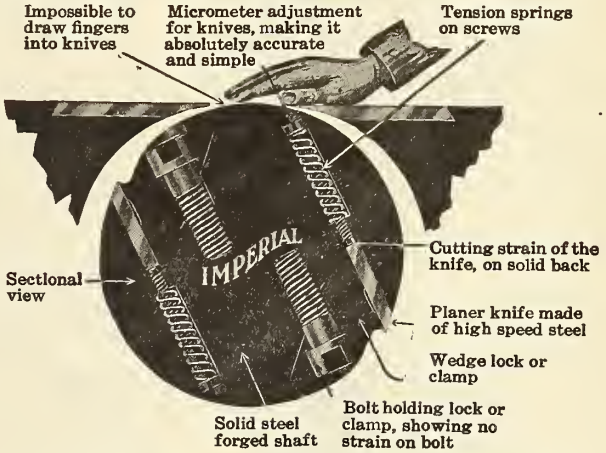
Our lathes are sold in Canada by

A. R. Williams Machinery Co., Toronto, Vancouver and Winnipeg.
General Supply Company of Canada, Ottawa.
Williams & Wilson, Montreal.

A. D. WAYMOTH & CO., Established in 1845

Broad Street, FITCHBURG, MASS.

"SAFETY FIRST" and Better Work


Impossible to draw fingers into knives
Micrometer adjustment for knives, making it absolutely accurate and simple
Tension springs on screws
Sectional view
IMPERIAL
Cutting strain of the knife, on solid back
Planer knife made of high speed steel
Wedge lock or clamp
Solid steel forged shaft
Bolt holding lock or clamp, showing no strain on bolt

Your men cannot do justice to the quality or quantity of their work if they operate with the fear of losing a finger or possibly a hand.

Install "Imperial" Round Safety Cylinders on your buzz planers and jointers. They fit so close to the table that accidents are impossible.

Imperial Machinery Co.

230 Ionia Ave. - Grand Rapids, Michigan

"Canadian Woodworker" Buyers' Directory—Continued

RIM AND FELLOE MACHINERY
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.

RIP SAWING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Foss & Hill Machinery Company, Montreal.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Sinker-Davis Company, Indianapolis, Ind.
Yates Machine Co., P. B., Hamilton, Ont.

SAFETY DEVICES
Gustafson & Scott Mfg. Co., Chicago, Ill.
Imperial Machinery Co., Grand Rapids, Mich.

SANDERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Nash, J. M., Milwaukee, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SASH, DOOR & BLIND MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Williams Machinery Co., A. R., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SAWS
Atkins & Co., E. C., Indianapolis, Ind.
Disston & Sons, Henry, Inc., Philadelphia, Pa.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Radcliff Saw Mfg. Company, Toronto, Ont.
Schmidt, F. A., Kitchener, Ont.
Shurly-Dietrich, Ltd., Galt, Ont.
Smith Co., Ltd., R. H., St. Catharines, Ont.

SAW GUMMERS, ALOXITE
The Carborundum Co., Niagara Falls, N.Y.

SAW SWAGES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Radcliff Saw Mfg. Co., Toronto, Ont.

SAW TABLES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SCRAPING MACHINES
Canada Machinery Corporation, Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass

SCREW DRIVING MACHINERY
Canada Machinery Corporation, Galt, Ont.

SCROLL SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SECOND-HAND MACHINERY
Cowan & Co., Galt, Ont.
Petrie, H. W., Toronto, Ont.
Wayne Machinery Co., Fort Wayne, Ind.
Williams Machinery Co., A. R., Toronto, Ont.

SHAFT OILERS
Nugent & Company, Wm. W., Chicago, Ill.

SHAPERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass
Yates Machine Co., P. B., Hamilton, Ont.

SHARPENING TOOLS
The Carborundum Co., Niagara Falls, N.Y.

SHAVING COLLECTORS
Sheldons Limited, Galt, Ont.

SHOOK BUNDLER
Neilson & Company, J. L. Winnipeg, Man.

SPRINGS FOR UPHOLSTERY
Foster Bros. Mfg. Co., Utica, N.Y.
Steel, James, Ltd., Guelph, Ont.

STAINS
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

STEAM APPLIANCES
Darling Bros., Montreal.

SINGLE SPINDLE BOXING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

STAVE SAWING MACHINE
Whitney & Sons, Baxter D., Winchendon, Mass

STEAM TRAPS
Canadian Morehead Mfg. Co., Woodstock, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

STEEL BOX STRAPPING
Acme Steel Goods Co. of Canada, Ltd.

STEEL SHELL BOX BANDS
Acme Steel Goods Co. of Canada, Ltd.

SURFACERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

SWING SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

TABLE LEG LATHES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Mattison Machine Works, C., Beloit, Wis.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

TABLE SLIDES
Walter & Co., B., Wabash, Ind.

TENONING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

TRANSMISSION MACHINERY
Dodge Mfg. Co., Ltd., Toronto, Ont.

TELEPHONES—PRIVATE SYSTEMS
Signal Systems, Limited, Toronto, Ont.

TRIMMERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

TRUCKS
Sheldons Limited, Galt, Ont.
National Dry Kiln Co., Indianapolis, Ind.

TUNGSTEN LAMPS
Canadian Laco-Philips Co., New York and Toronto.

TURNING MACHINES
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Mattison Machine Works, C., Beloit, Wis.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

UNDER-CUT SELF-FEEDING FACE PLANER
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

UPHOLSTERING SPRINGS
Steel, James, Ltd., Guelph, Ont.

VARNISHES
Ault & Wiborg Company, Toronto, Ont.

VARNISH SPRAYERS
DeVilbiss Mfg. Co., Toledo, Ohio
Paasche Air Brush Company, Chicago, Ill.

VENEERS
Acme Veneer & Lumber Co., Cincinnati, Ohio
Barnaby, Chas. A., Greencastle, Ind.
Bury & Company, Robert, Toronto, Ont.
Central Veneer Co., Huntington, W. Virginia.
Clark Veneer Co., Walter, Grand Rapids, Mich.
Dupre & Company, Toronto, Ont.
Empire Veneer Company, Chicago, Ill.
Hartzell, Geo. W., Piqua, Ohio.
Hoffman Bros. Company, Fort Wayne, Ind.
Geo. Kersley, Montreal, Que.
Nartzik, J. J., Chicago, Ill.
Ohio Veneer Company, Cincinnati, Ohio.
Penrod, Jurden & McCowen, Memphis, Tenn.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Roberts Veneer Co., New Albany, Ind.
Toronto Veneer Company, Toronto, Ont.
Waetjen & Co., George L., Milwaukee, Wis.

VENEER TAPE
Ideal Coated Paper Co., Brookfield, Mass.

VENTILATING APPARATUS
Sheldons Limited, Galt, Ont.

VENEER JOINTERS
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co. Toronto, Ont.

VENEER PRESSES (Hand and Power)
Canada Machinery Corporation, Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Hydraulic Machinery Company, Montreal, Que.
Jackson, Cochrane & Company, Kitchener, Ont.
Perrin & Company, Wm. R., Toronto, Ont.

VISES
Fay & Egan Co., J. A., Cincinnati, Ohio.

WAGON AND CARRIAGE MACHINERY
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass
Yates Machine Co., P. B., Hamilton, Ont.

WATCHMAN'S CLOCKS
Signal Systems, Limited, Toronto, Ont.

WOOD FINISHES
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

WOOD PULLEYS
Dodge Mfg. Co., Ltd., Toronto, Ont.

WOOD TURNING MACHINERY
Canada Machinery Corporation, Galt, Ont.
Defiance Machine Works, Defiance, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Waymoth & Co., A. D., Fitchburg, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

WORK BENCHES
Fay & Egan Co., J. A., Cincinnati, Ohio.

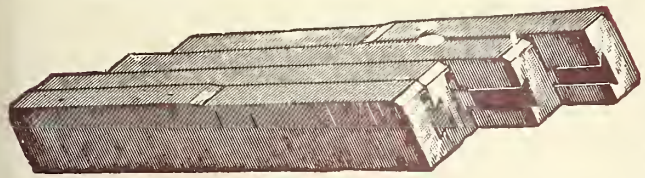
WOOD TURNINGS
Toy Products Co. of Canada, Farm Point, Que.

WOODWORKING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Elliot Woodworker Limited, Toronto, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Foss & Hill Machinery Company, Montreal.
Garlock Walker Machinery Co., Toronto, Ont.
Hall & Brown Machinery Co., St. Louis, Mo.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Reynolds Pattern & Machine Works, Moline, Ill.
Williams Machinery Co., A. R., Toronto, Ont.

WHEELS, Grinding, Carborundum and Aloxite
The Carborundum Co., Niagara Falls, N.Y.

Making TABLE-SLIDES is a Specialty Business

For more than TWENTY-FIVE YEARS we have made TABLE SLIDES exclusively. Our Factory is equipped with Special Machinery which enables us to make SLIDES,—BETTER and CHEAPER than the furniture manufacturer.



Canadian Table makers are rapidly adopting WABASH SLIDES

Because { They ELIMINATE SLIDE TROUBLES / Are CHEAPER and BETTER

Reduced Costs / **Increased Out-put** { BY USING **WABASH SLIDES**

MADE BY

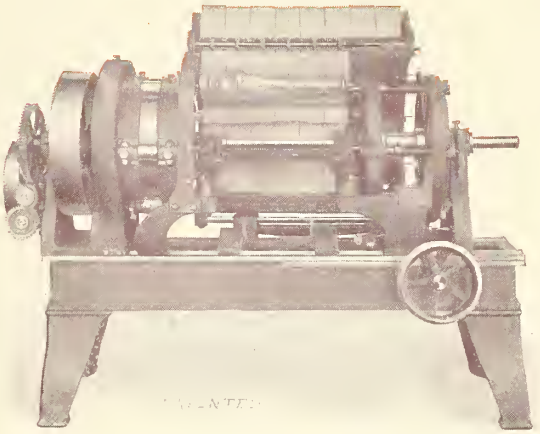
B. Walter & Company

Wabash, Ind.

The Largest EXCLUSIVE TABLE-SLIDE Manufacturers in America

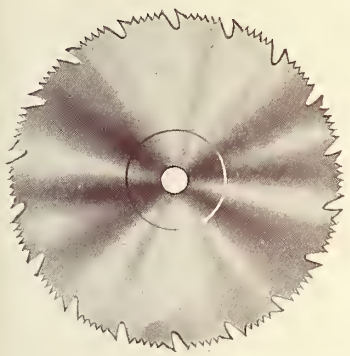
ESTABLISHED-1887

Release Your Men for Higher Duties



Let the Nash Sander do your sanding of furniture turnings, etc. It will take the place of from **five** to **fifteen men,** and do the work better.

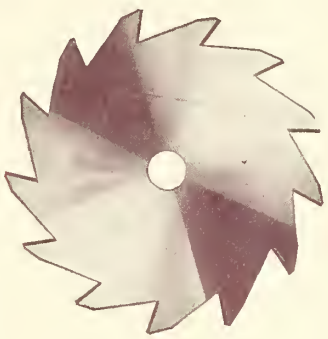
J. M. NASH, MILWAUKEE, Wis.



ATKINS

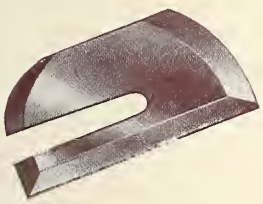
STERLING QUALITY

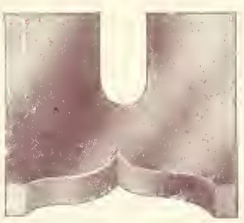
SAWS and KNIVES



The best steel—the most careful and accurate workmanship—the equipment that will eventually save you money.

Atkins Sterling Quality Saws and Knives are proving their superiority by competitive tests in the largest plants of the country. We welcome your most careful investigation, as we know the satisfaction that will result.



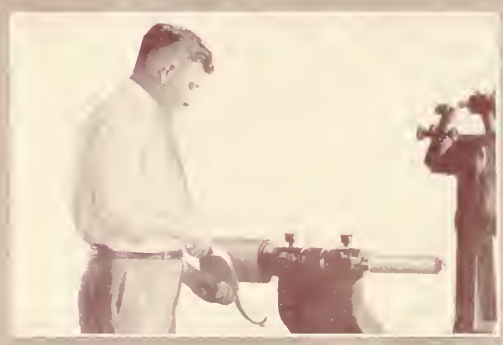


Write to-day for our Knife Booklet "C W" and Pattern Template Paper.

E. C. ATKINS & CO.

Makers of Sterling Saws

Factory—HAMILTON, Ont. Vancouver Branch—109 Powell Street



How to Sand a Cabriole Leg

The pictures tell the story!

By this method there is combined in one machine the various sanding applications that are necessary to reach the many different curves and irregularities of the Cabriole Leg.

It is in such compact form that the operator is enabled to complete the leg in one handling.

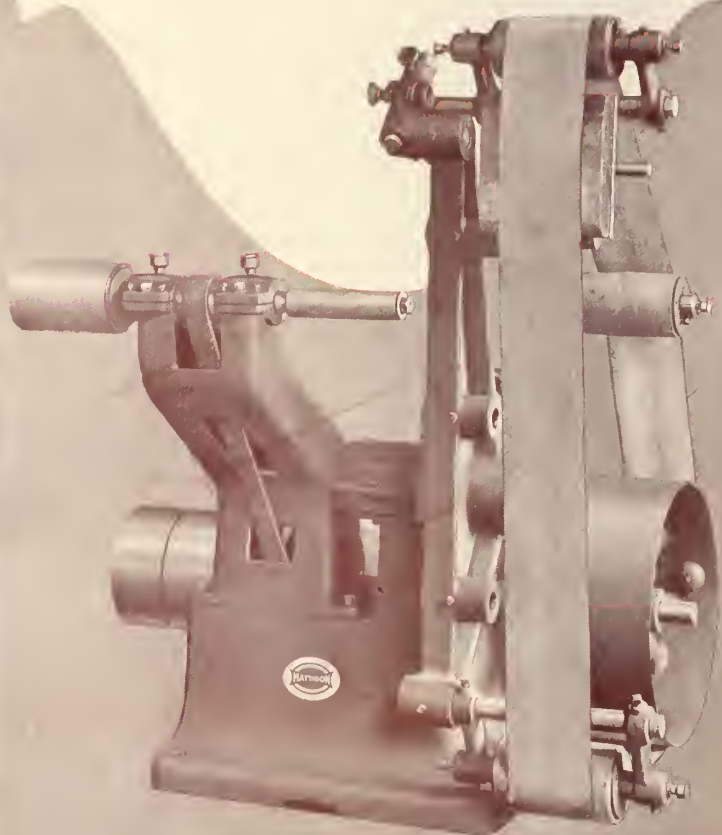
This is a machine, moreover, that fills a long-felt want in the average factory, not only for Cabriole Leg sanding, but for the "thousand and one" irregular shapes that are now handled on makeshift devices.

Full information on request.

C. Mattison Machine Works

883 Fifth Street

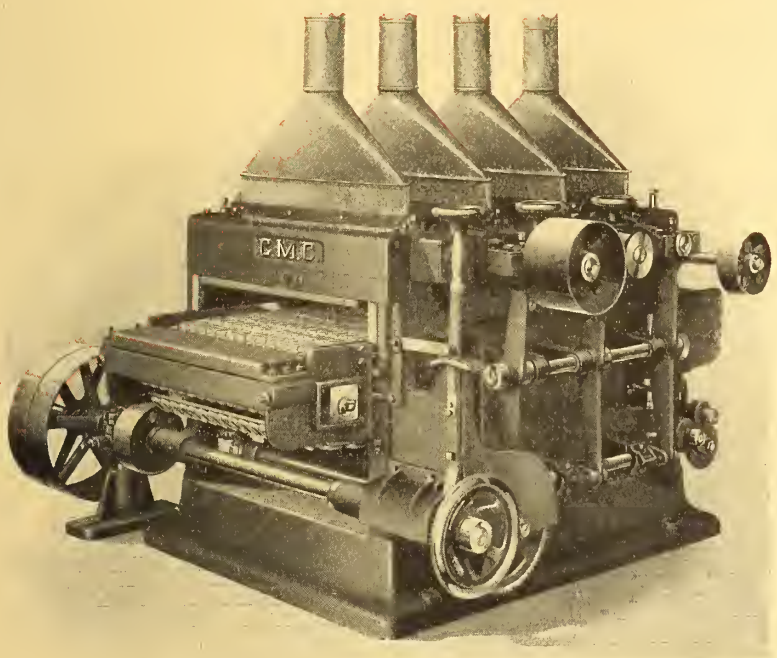
BELOIT, WISCONSIN, U. S. A.



Volume Seventeen TORONTO, NOVEMBER, 1917 Number Eleven

CANADIAN
WOODWORKER
and
Furniture Manufacturer

C.M.C.



No. 400 Revolving Bed Sander

A SANDING MACHINE OF UNUSUAL MERIT

Our 3 Drum Revolving Bed Sander is of the most improved design and construction. It does sanding of the highest class and is economical in operation. Full details and illustrations given in our Bulletin No. 400—gladly sent on request.

CANADA MACHINERY CORPORATION
LIMITED

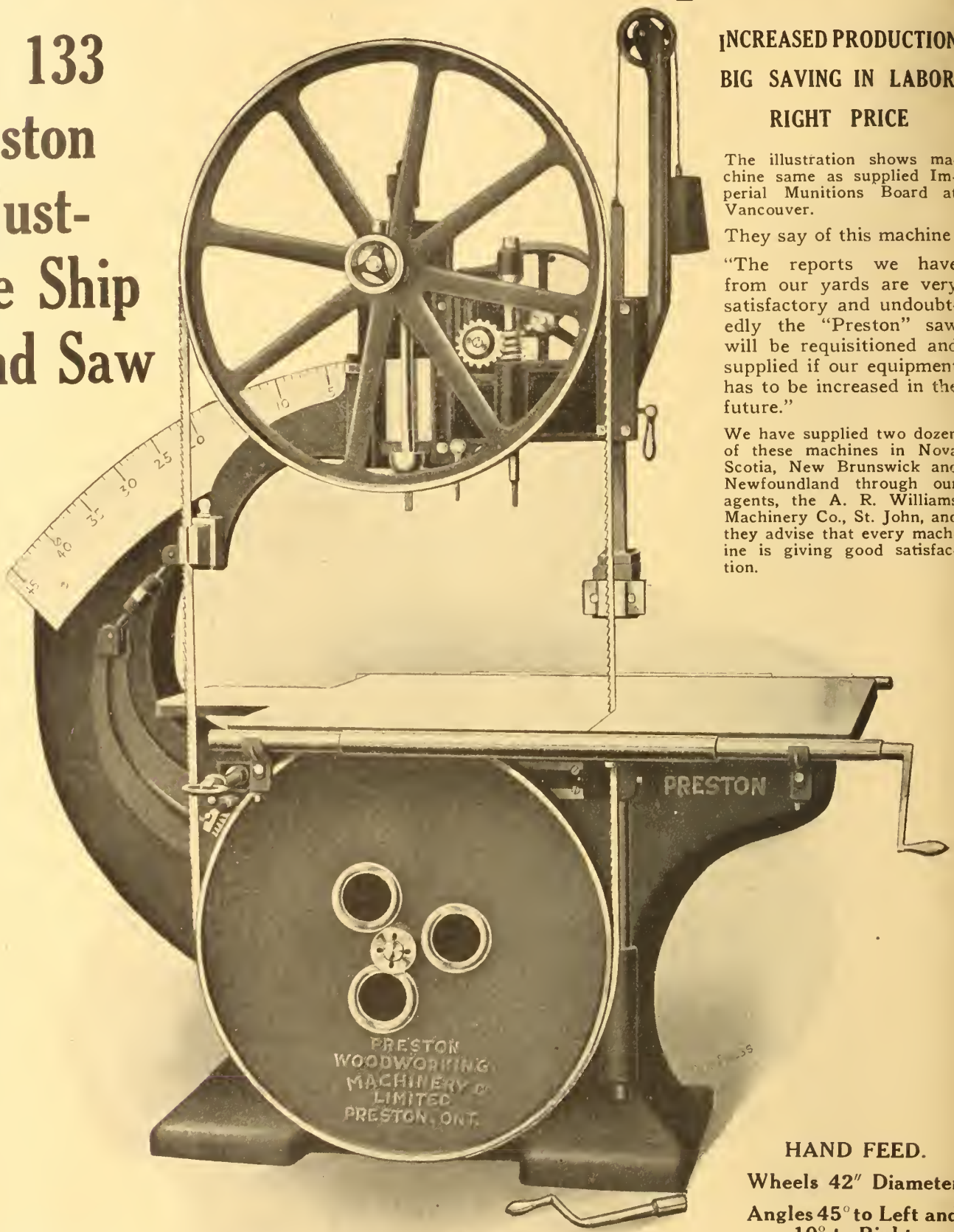
GALT - ONTARIO

Toronto Office and Showrooms: Brock Avenue Subway

Alphabetical Index to Advertisers, Page 10

A Money Maker for Shipbuilders

No. 133 Preston Adjustable Ship Band Saw



INCREASED PRODUCTION

BIG SAVING IN LABOR

RIGHT PRICE

The illustration shows machine same as supplied Imperial Munitions Board at Vancouver.

They say of this machine:

"The reports we have from our yards are very satisfactory and undoubtedly the "Preston" saw will be requisitioned and supplied if our equipment has to be increased in the future."

We have supplied two dozen of these machines in Nova Scotia, New Brunswick and Newfoundland through our agents, the A. R. Williams Machinery Co., St. John, and they advise that every machine is giving good satisfaction.

HAND FEED.

Wheels 42″ Diameter

Angles 45° to Left and 10° to Right

Ask for Circular

The Preston Woodworking Machinery Co., Limited

Sales Agents: A. R. Williams Machinery Co., St. John, Vancouver and Toronto.

PRESTON, ONT.

GARLOCK-WALKER MACHINERY CO. LIMITED

32 FRONT ST. WEST, TORONTO TELEPHONE MAIN 5346

Labor-Saving and Time-Saving Machinery

In all woodworking plants, under present conditions, up-to-the-minute LABOR-SAVING and TIME-SAVING machinery is an absolute necessity from a profitable business standpoint.

In no other way can the manufacturer so readily reduce the cost of his product without detracting from its quality.

We will on request, without obligation on your part, send cuts and descriptions of the latest improved machines for any operation. They give information that will be valuable for your files.

A List of Our Leading Woodworking Machines:

Band Resaws.
Band Rip Saws.
Band Edging and Ripping Machines.
Band Scroll Saws.
Bevel Band Saws.
Box Board Matchers.
Buzz Planers.
Box Machinery.
Boring Machines, Horizontal or Vertical, Single or Multiple Spindle.
Carving Machines.
Circular Saws, Rip and Cross Cut.
Combination Saws.
Cut-off Saws.
Dado or Grooving Machines.
Dovetailers.
Drum Sanders.
Endless Bed Sanders.
Furniture Graining Machines.
Filing and Setting Machines.
Gang Edgers and Rippers.
Glue Jointers.
Automatic Gang Rip Saws.
Hardwood Flooring Outfits.
Jointers, Power and Hand Feed.
Knife Grinders.
Lathes — Back Knife, Manual Training, Pattern Makers'.
Lath Mills and Bolters.
Lumber Registers.
Mitre Machines.
Mortisers — Hollow Chisel, Vertical or Horizontal.
Moulders—Inside or Outside.
Nailing Machines.
Planers—Endless Bed.
Planers and Matchers, light.
Planers and Matchers, Fast Feed.
Rod and Dowel Machines.
Sanders, Drum, Disc, etc.
Shapers, Single and Double Spindle, with Babbitt, Bronze, or Ball Bearings.
Sash and Door Outfits.
Screw Driving Machines.
Surfacers, Single or Double.
Swing Saws.
Timber Sizers.
Tenoners, Single or Double End.
Veneer Presses.
Variety Lathes.
Veneer Jointers.
Universal Saw Benches.
Wood Turning Lathes.

"EVERYTHING IN WOODWORKING MACHINERY."

Garlock-Walker Machinery Co., Ltd.

32 Front Street West, Toronto

METAL and WOODWORKING MACHINERY of all Kinds

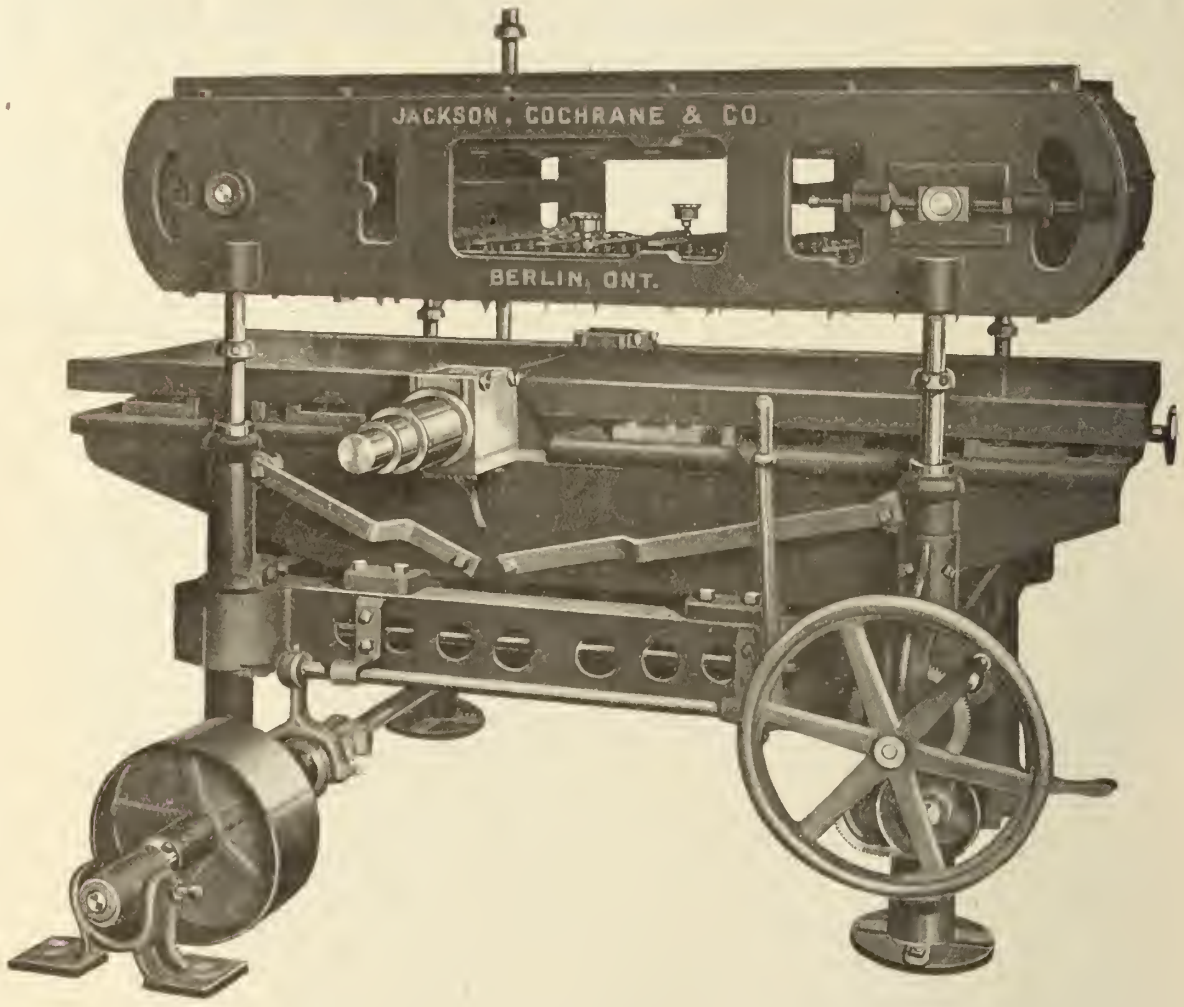
The

Herzog Self-Feed Jointer

means

Increased Production — Simplicity of Operation
Small Floor Space — Safety to Employees

Does Four Times the Work of the Hand Jointer



Our No. 34 Herzog Jointer, illustrated above, is one of the most efficient machines on the market to-day. It is appreciated by the manufacturer and employees alike, because, while it will produce from three to five times as much work as the hand jointer, it does not require skilled operators, but eliminates the danger so common to other makes. It can be operated by two boys. It will handle stock varying in width from 1 inch to the full width of the jointer, will feed fast or slow, takes only one-fourth the floor space of hand jointers, and requires only one-fifth of the sharpening of the knives. It is fitted with power feed raising and lowering attachment, with cylinder double belted and driven from both ends.

If interested in reducing your costs, write us.

Jackson, Cochrane & Company

KITCHENER - CANADA

Electrified Surfacing— Means Intensified Profits

Yates

Motor Drive No. 177 Double Surfacer

The Yates No. 177 has always been a profit producer, but with motor attached it becomes a self-contained, compact double surfacer that intensifies the usual profits. No belting and shafting to eat up horsepower and demand a score of attentions.

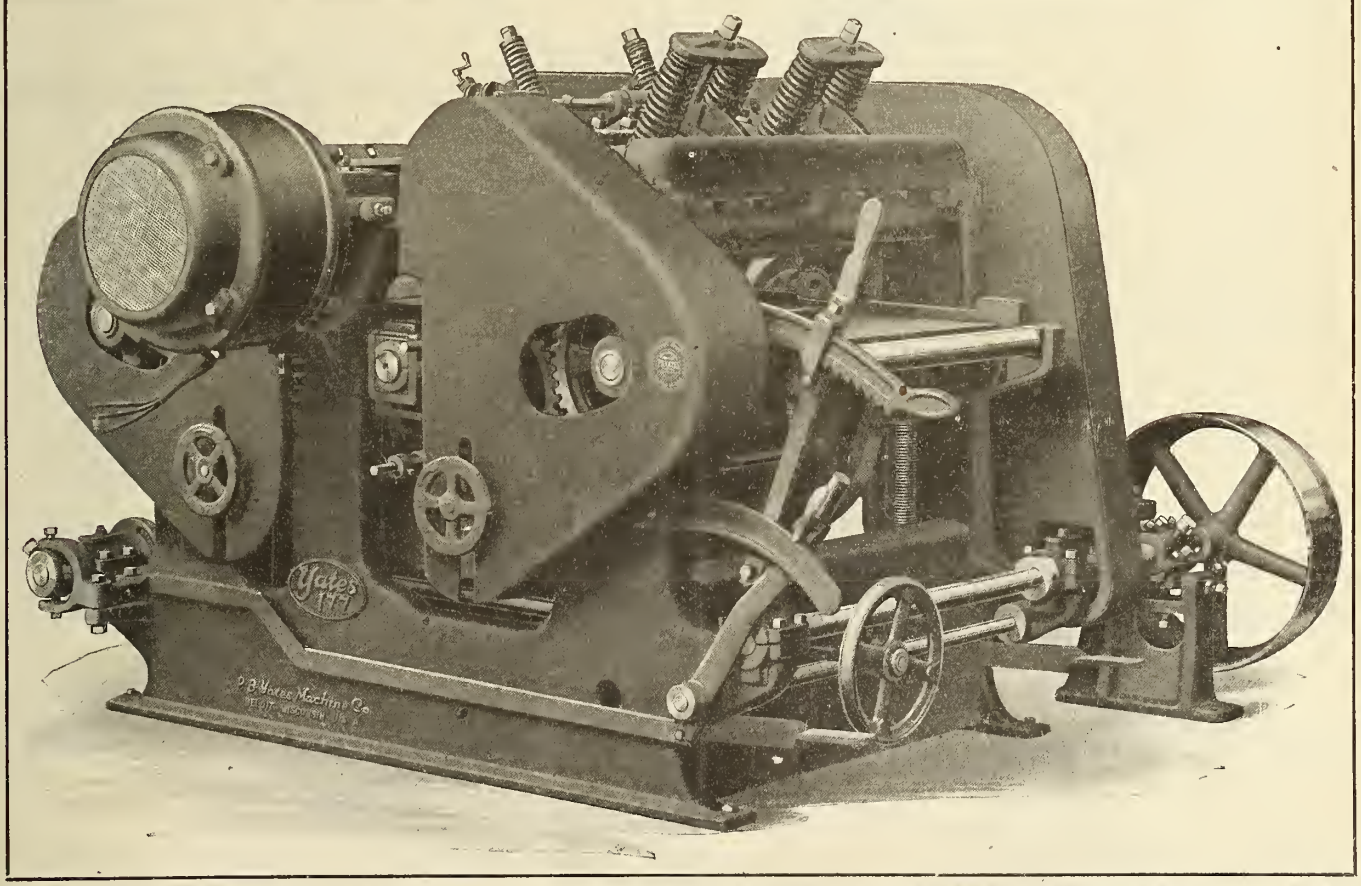
While the boys are "doing their bit" overseas, machines ought to do their's at home. Scarcity of labor puts the responsibility of production and profits up to the machine. The No. 177 will take all you can give it, year in and year out, and boost your profits by both quality and quantity production.

Your request for further information involves no obligation.

P. B. Yates Machine Co. Ltd.
HAMILTON, ONT. CANADA
U.S. Plant: Beloit, Wisconsin.

Yates

"The Invariable Choice of the Man Who Knows"



LACO NITRO LAMP

LIGHT IS AN ASSET

The benefits of sunlight are thrust upon you, but you yourself must acquire the advantages of proper artificial lighting.

In thousands of mills, shops, and woodworking establishments the real money-saving value of efficient artificial lighting is already appreciated, and good light is considered an asset and production-increaser.

Provide for your employees more hours of light in which to render efficient productions. Give them artificial light which will maintain their skilled capacity throughout the full eight-hour day or night shift.

Protect them against accident and error risks, and make their working vicinity bright and cheerful by using

LACO NITRO LAMP "The light that gives more light"

The LACO NITRO LAMP is gaining daily in popnlarity because of its many superior merits over other type lamps.

Low in operating cost and high in efficient service. Uses less current and gives a clearer, brighter light than heretofore possible. Scientifically constructed with tungsten filament substantially suspended in nitrogen gas-filled bulb, thus securing long utility under severe usage.

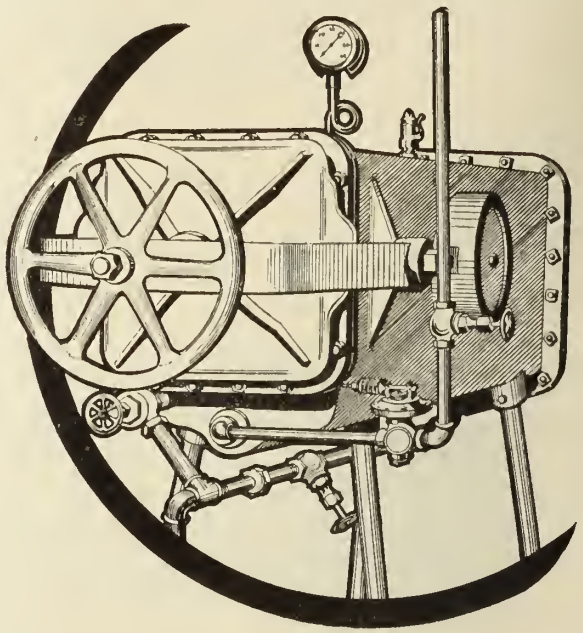
INQUIRE FROM YOUR NEAREST DEALER

CANADIAN LACO-PHILIPS CO.
LIMITED

Stocks available at

Montreal Toronto Winnipeg Vancouver

Wood Steaming Retort



Wood Bending Manufacturers:

This is one of our

Perfection Retorts

which we guarantee will save you

50% Less Breakage

in your bending department than your present process; that your stock will dry in your forms or presses in one-third less time; that you will have no stained stock; that your stock will retain its shape much better after being bent; that it will dry in your dry-kiln in one-half less time and that your steam consumption will be reduced at least 90 per cent.

The door can be opened and closed in ten seconds, and it is steam and water tight and for this reason can be placed anywhere in your factory.

Compare this IMPROVED RETORT with your present steam boxes, then write us for our Booklet on Progressive Wood Steaming.

Made in Preston, Ontario

Perfection Wood Steaming Retort Co.

PARKERSBURG - WEST VIRGINIA

The "Shimer Limited" Expansion Head

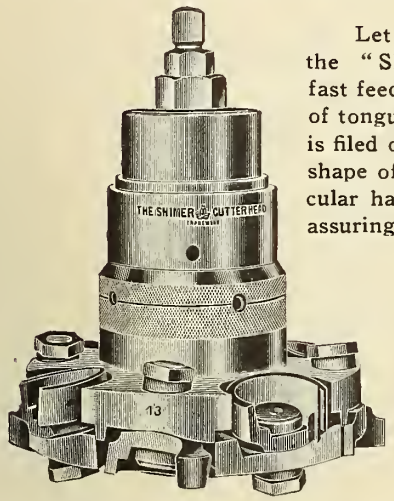


Fig. 627

Let us draw your attention to the advantages of using the "SHIMER CUTTER HEAD" for general Mill and fast feed Planer work. The Cutter is turned to cut the shape of tongue and groove desired, so that to sharpen the cutter it is filed or ground on its face, guaranteeing the user the same shape of cut during the life of the cutter. The bit being circular has from 3½ in. to 5 in. cutting length to the cutter, assuring long wearing life to the cutters.

Note that the cutter, being fastened to a concave seat on a compound angle, assures the user of the proper clearance of cutters, consequently they never burn.

These heads are fitted with or without the Self-Centering Sleeve, and made Expansion or Solid, to suit the customer's wishes.

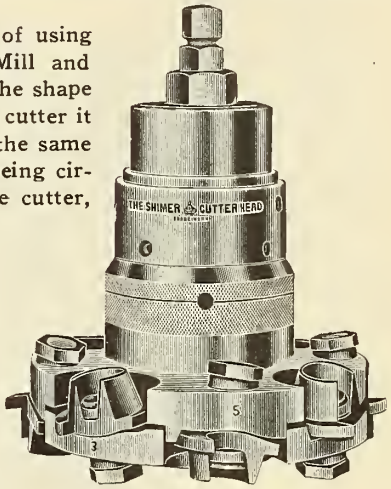


Fig. 268

Shimer Heads have been in use for sixty years, and their reliability and reputation have spoken for them in the past. Let us know your wants and we will guarantee their reliability at the present.

SHIMER CUTTER HEAD CO. OF CANADA, LIMITED

Successors to Samuel J. Shimer & Sons, Inc.

GALT, ONTARIO

Simonds Saws

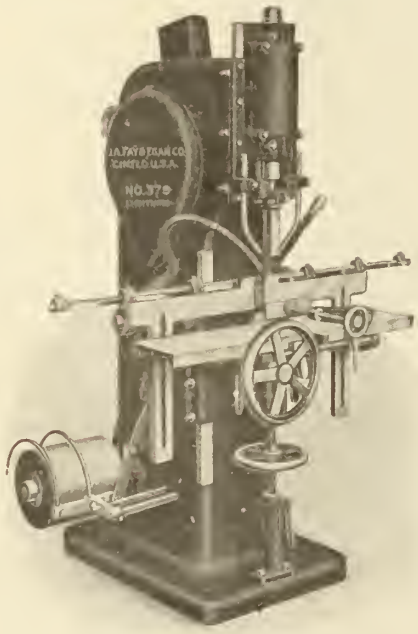
Whenever you buy a Simonds Saw, be it band, gang, solid, or inserted tooth circular saw, you buy first, last, and always saw quality that starts with the selection of the raw material, and comes right through to the last cut made in the mill with that saw.

We make every description of saws used in lumbering, mill work, and on woodworking machinery, cross-cut, gang, band, and solid or inserted tooth circulars. The next saw you buy let it be a **SIMONDS.**

SIMONDS CANADA SAW CO., Limited - **MONTREAL, Que.**

VANCOUVER, B.C. ST. JOHN, N.B.

Side View



Front View – Plain Table.

—A New Automatic Hollow Chisel Mortiser

FAY-EGAN LIGHTNING No. 379

—carries chisels up to 1 ½" square.

—stroke adjustable from 0 to 5".

—four speeds to chisel ram.

—micrometer set for chisels and augers so you won't break chisels.

—self-contained blower for removing chips.

—all mechanism enclosed.

—bronze bearings.

—plain, compound, or universal table.

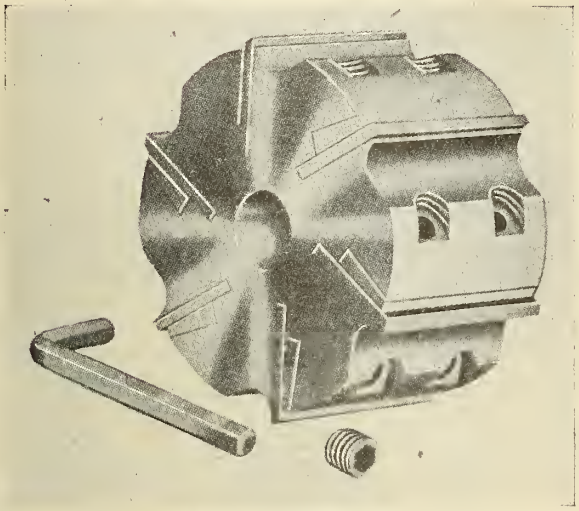
—everything you hoped some day to find in your ideal of a mortiser.

Write for Bulletin J-26.

J. A. FAY & EGAN CO.

153-173 W. Front Street **CINCINNATI, OHIO**

Safety High Speed Cutter Head



2, 4 and 6 in KNIVES.

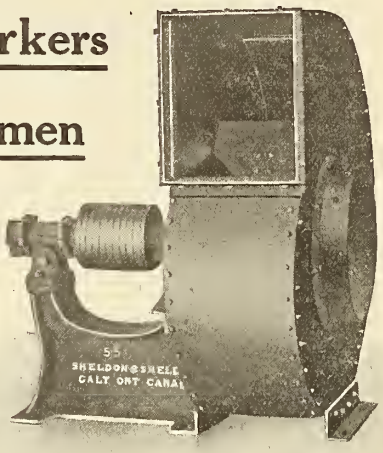
Adapted to use for top, bottom and side heads on moulding, flooring and surfacing machines.

Write for catalog of Machine Knives and Cutter Heads.

E. E. GAGE MFG. COMPANY

301 N. MAIN ST., GARDNER, MASS.

Woodworkers and Lumbermen



The Sheldon Exhaust Fans have characteristics that adapt themselves to the service of the Planing Mill or Wood-working Plant. They are specially designed for this kind of work, having a saving in power and speed of 25% to 40%.

Write for Industrial Booklet.

SHELDONS LIMITED - Galt, Ont.

Toronto Office, 609 Kent Building

— Agents —

Messrs. Ross & Greig, 412 St. James St., Montreal, Que.
Messrs. Walker's Limited, 259-261 Stanley St., Winnipeg. Man.
Messrs Gorman, Clancey & Grindley Ltd., Calgary and Edmonton, Alta.
Messrs. Robt. Hamilton & Co., Ltd., Bk. of Ottawa Bldg, Vancouver, B.C.

DUST SEPARATORS
100% EFFICIENCY

The Toronto Blower Co. will send an expert Engineer of extended experience to view Plants where the installation of Exhaust Systems are contemplated.

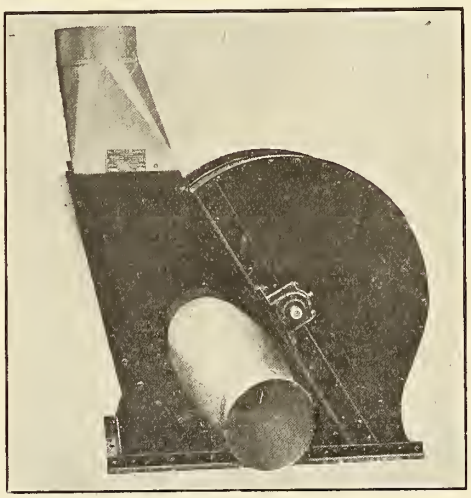
Slow Speed, Low Power EXHAUST SYSTEMS WITH THE "FOSTER" FAN

We manufacture and install the system complete, including Fans, Galvanized Iron Pipe, Dust Collectors, Auto-Furnace Feeders, Hoods for Woodworking Machines, Buffing and Polishing Wheels, etc. Exhaust Systems a specialty. We have experienced mechanics to do the erecting, and can therefore ensure a first-class job that will give perfect satisfaction.

Years of practical experience.

Correctness of design is the most important factor in the construction of an Exhaust System.

Protect your workman.



Note the inlet opening.

It is so placed that air and material is immediately discharged without being carried around fan-wheel. There are two ball-bearings on pulley side of case and one on inlet side.

Efficient fan with minimum power.

Toronto Blower Company

156 Duke Street, Toronto

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Toronto

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Ontario and Quebec Stocks, East or West, rail or water shipment direct from mill to factory.

We have a few choice cars of

4/4, 6/4 and 8/4 Birch

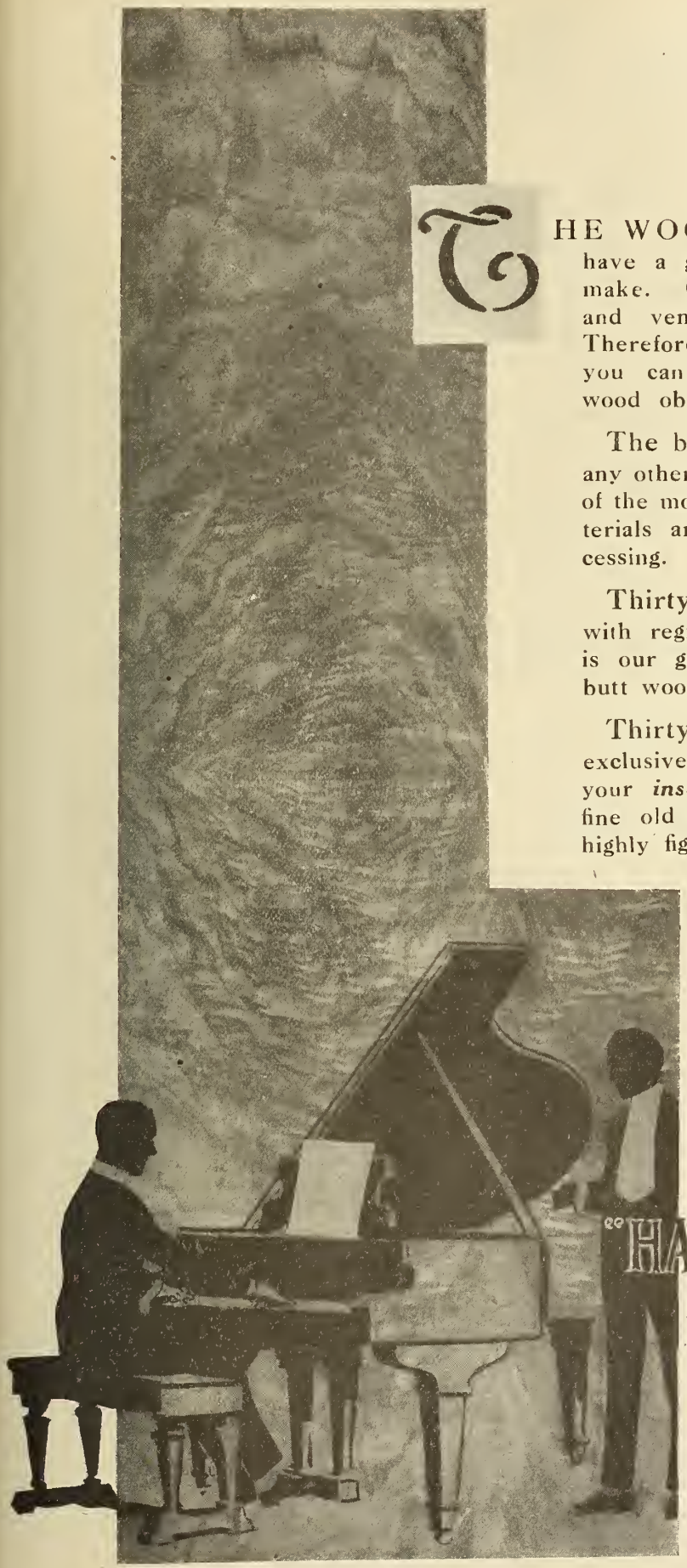
High grade 1sts and 2nds and No. 1 Common, running well to long lengths.

Let us quote you on

1", 2" and 3" Quebec Merchantable Spruce

We Commend to Your Notice:

Our lumber is reliable, our grades uniform, our shipments prompt, and receive personal supervision; our prices consistent. We have had long experience. We desire to serve.



THE WOODS you use in your pianos have a great deal to do with the sales you make. Other things being equal, the finish and veneer are the determining factors. Therefore, for your high priced instruments, you can afford nothing but the very best wood obtainable.

The best in walnut veneers, as in any other manufactured products, is the result of the most experienced selection of raw materials and the most intelligent care in processing.

Thirty-six years of constant contact with regions where the finest walnut grows is our guarantee to you of the best piano butt wood obtainable anywhere.

Thirty-six years of careful study of exclusive walnut manufacturing problems is your ***insurance*** that you will get from our fine old butt wood the last square inch of highly figured quality.

HARTZELL'S walnut is "Honor" walnut but it is attractive from the standpoint of price also.

"HARTZELL'S CHOICE WALNUT"

—is made for you and to fit your needs by

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PIQUA, OHIO

Saint Francis Basin Band Sawed Oak

Soft Textured, Evenly Colored, Red and White

QUICK SHIPMENT

An Example of Real Service

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(Two cars were ordered — car numbers wired our customer one hour after receipt of order—cars loaded same day, pulled from our siding early next morning, and will be wire-traced till delivered.)

We are Headquarters for

St. Francis Basin Kraetzer Cured Gum

Send us a list of your requirements. — Delivered Prices will be cheerfully quoted

GEO. C. BROWN & CO.

Mill—PROCTOR, Ark. **Main Office—MEMPHIS, Tenn.**

We specialize in Tennessee Aromatic Red Cedar

RED GUM

"America's Finest Cabinet Wood"

Among the important effects of the European debacle on the American point-of-view has been the stimulation of pride in, and reliance upon, our own resources. This is good business as well as intelligent patriotic sentiment.

For instance, we have learned that we need no longer go to the Ural mountains or the swamps of Brazil or any other foreign land for truly SUPERIOR CABINET WOODS.

Red Gum is essentially "THE" AMERICAN cabinet wood—and America is proud of it.

Owing to the splendid WORKING QUALITIES, Furniture Manufacturers have found there is a saving of about 20% in actual TIME in manufacturing Gum furniture, as against the time consumed in making the same pieces in other fine cabinet woods. Another point to remember, is that Red Gum lumber comes in better widths and lengths, which affords a BIG SAVING in WASTE material. RED GUM VENEERS are superb "very sweet" to work with and SELL THEMSELVES to the very best trade. (Yes, Red Gum *Veneers.*)

RED GUM FURNITURE MANUFACTURE HAS MORE THAN DOUBLED IN THE PAST TWO YEARS

We have a great deal of interesting data for furniture manufacturers. Write for it today.

Gum Lumber Manufacturers' Association

1314 *BANK OF COMMERCE BLDG., MEMPHIS, TENNESSEE*

Dry Spruce and Birch

Good Stocks, Prompt Shipments, Satisfaction

C. A. SPENCER, Limited

Wholesale Dealers in Rough and Dressed Lumber

Offices—500 McGill Building
MONTREAL - - Quebec

"Gum of Quality"

Yazoo River Red Gum

as produced by

Thomas & Proetz Lumber Company

3400 No. Hall St. St. Louis, Mo.

is carefully manufactured; soft in texture; dark, rich in color; and admirably suited for furniture and interior trim.

Mills—Belzoni, Miss.; Catchings, Miss.; Naples, La.

If you are not buying from us, write today.

American Hardwood Lumber Co.

St. Louis, Mo.

Large stock of—

Dry Ash, Quartered Oak Plain Oak and Gum

Shipments from — NASHVILLE, Tenn., NEW ORLEANS, La., and BENTON, Ark.

Red Gum

Quartered or Plain Sawn

Thick or Thin

This Has Been Our Specialty for Twenty Years

Red and White Oak

Quartered or Plain

All Thicknesses

Mills:
Percy, Greenwood and Ruleville, Mississippi

Head Offices—CINCINNATI, OHIO

The

KORN-CONKLING CO.

SHELL BOX WIRES

Let us supply you with these wires, with looped ends, bent to fit the box, ready for nailing, with staples included.

Our equipment will enable us to supply you any quantity on short notice. Perfect quality. All alike

WE ARE MANUFACTURERS OF

Wire and Wire Products

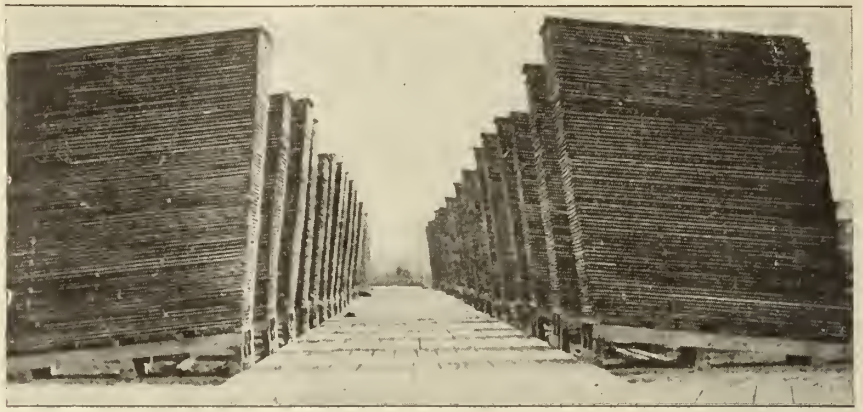
Bale ties, Heading ties, Lath ties, Hardwood Flooring ties, Wire Nails, Flat Steel or Wire Barrel hoops. All sizes of Fine wire in Bright, Tinned or Galvanized, manufactured to order.

Laidlaw Bale-Tie Co., Ltd.

A. T. Diggins, Toronto, Ont. H. E. O. Bull, Montreal, Que.
Harry F. Moulden & Sons, Winnipeg, Man.

Head Office and Works: Hamilton, Canada

Two Conclusive Proofs Why You Should Buy Your Lumber From Us



Examine closely the picture above, then read the following letter we received a few days ago from one of the largest manufacturers of Mouldings in the world. (Lumber for Mouldings must be absolutely flat and straight.)

"We have been using exclusively gum lumber, both sap and red, shipped by you for the last three years, and have been well pleased with its character, both as to grade and condition. The condition of same being an evidence of careful handling before shipping. We have been well pleased with the transactions which we have had with you, and will endeavor to continue using your stock as long as available."

We also manufacture Oak, Ash, Elm, and Cypress at Louise, Miss., mills. Get our prices before placing your orders and become a SATISFIED user of Gum or one of the other Southern hardwoods.

BARR-HOLADAY LUMBER CO.

GREENFIELD - OHIO

& YET AGAIN

here's proof that we are not only PULLING FOR GOOD OLD

OAK

but also *for those WHO SELL IT—*

IS THIS YOU?

Month by month we are working on the CONSUMER (*Your Customer*) for a big, strong "COME-BACK" **of OAK!**

Watch us!

Does your line meet the issue? If not, it can by next season.

"The Return of the Prodigal Taste"—a true story in one adv. (see below)

STILL ANOTHER OAK FURNITURE ADV. APPEARING IN THE BEST MAGAZINES IN AMERICA.

"THE BASIS OF FURNITURE COMPARISONS"

The following conversation really happened once that we know of. Probably it is paralleled many times—the country over. (Perhaps by *you.*)

"Every time I look around our new home, dear, I am thankful to the architect for being so insistent about this OAK furniture. He said we'd have to do a lot of insisting to get really *good* furniture in this noble wood—and it certainly is worth all the insisting we did."

"Well, I told you we had an architect who was well-grounded in his taste and his knowledge. He ...

AMERICAN OAK MFRS' ASSN., *LET US CONSULT TOGETHER FOR THE GOOD OF ALL CONCERNED. WRITE US. WE'LL ANSWER.*
ROOM 1408, 14 MAIN STREET, MEMPHIS, TENNESSEE

"All that the Word Implies"

We have endeavored to build up an organization which will insure service to our customers, and will make the term, used in connection with the business of Penrod, Jurden & McCowen, really significant. This is our idea of

"P J M SERVICE"

Scientific Drying **Expert Manufacturing**
Good Timber **Modern Mills**
Satisfaction to the Buyer

Southern Rotary Veneers and Hardwood Lumber

We can take care of your requirements in Southern woods, no matter whether you are in the market for veneers or lumber. Our big Rotary Veneer Mill at Helena, Ark., has exceptionally large units, and can readily supply sizes which are ordinarily difficult to produce. Our lumber mills are cutting some of the finest hardwood stock ever manufactured in America. Tell us what you want—we can supply you.

On account of car shortage, which affects delivery of logs to the mills as well as shipments of veneer—we urge all buyers of veneers to place requirements at least 60 to 90 days in advance.

Penrod, Jurden & McCowen (Incorporated)

General Offices, MEMPHIS, TENN.
Bank of Commerce Building

BETTER VENEERS

Classy Individuality of Figure and Color has always distinguished PENROD VENEERS. It's a habit acquired by the Penrod Organization by thirty years' careful study of the requirements of ultra-particular manufacturers of fine Walnut furniture, musical instruments, panels, etc.

Right now this feature of PENROD SERVICE is more pronounced than ever before. Uncle Sam is using millions of feet of Walnut timber. This great demand has resulted in unprecedented production of Walnut logs and stumps, which gives us a wider range for the selection of finer quality and greater variety of rare veneer woods.

Our present stock is unequalled in size, variety, and quality.

Send for a line of samples and see for yourself—give it the "once over" before the January rush.

Ante bellum **prices till the end of the year. Order NOW.**

Penrod Walnut & Veneer Company

KANSAS CITY - - - MISSOURI

American Walnut Veneer

A Sample which shows the class of Veneer we handle.

Our efforts are centered in obtaining the highest grade of
FIGURED WALNUT FOR VENEER CUTTING

Our customers' often repeated orders prevent us from keeping a large stock on hand, but as we are continually selecting our stock from the large quantity of logs we handle, we always have a nice line of the highest grade to select from.

Our reputation is based on "Quality, not Quantity" in our Veneer business

PICKREL WALNUT CO.

ST. LOUIS, MO.

ENGLISH BROWN OAK

M. B.

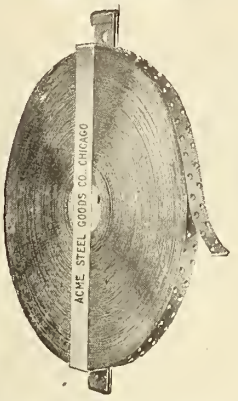
If you would know just how rich an effect English Brown Oak imparts to a room, visit the Circuit Court Room in the new Court House. It is finished throughout in English Brown Oak furnished by The Martin-Barriss Company.

Notice how its soft coloring and refined figure give real beauty to the paneling. Notice how readily it lends itself to carving. And notice the lasting tightness of the joints.

Make your own selection of figure at our mill.

The Martin-Barriss Co.
Cleveland, Ohio

"DOT EMBOSSED"
300 Foot Coil



Patent Coil Holder

ACME

Lacquered to prevent rusting, and the surface is embossed to prevent nails from slipping.

In coil of 300 feet, 20 coils to a case also in coil of 3,000 feet

For prices and samples write to

ACME STEEL GOODS CO. OF CANADA, LIMITED
MONTREAL

Agents: British Columbia, Alberta, Sask., V. A. C. McIntyre & Co. - Winnipeg
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Montreal J. M. Vaquin Montreal
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Churchill-Milton Lumber Co.
Sales Office: Louisville, Ky.
Mills—Greenwood, Miss.; Glendora, Miss.

Let us have your enquiries for—

Ash
Plain Oak
Quartered White Oak
Quartered Red Oak
Elm
Tupelo
Cottonwood

Plain Red
Quartered Red — **G**

Sap — **U**

Qtd. Red, Sap
No Defect — **M**

OUR SPECIALTY IS DELTA GUM

The Atlantic Lumber Co.
Manufacturers

Strictly Soft Textured

Quartered and Plain White Oak
Red Oak

Chestnut, Poplar, Cherry

Tennessee Scented Red Cedar

High Grades—Quick Shipments

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Phone Main 6386

HEAD OFFICE, BOSTON MASS.

Mills: KNOXVILLE, TENN., WALLAND, TENN.
FRANKLIN, ARRINGDALE and BUTTERWORTH, VA.

Galbraith & Co., Ltd.
Owen Sound, Ont.

Manufacturers of

"Well-Made" Wood Specialties

Toys, Games, Turned Goods and Kitchenware

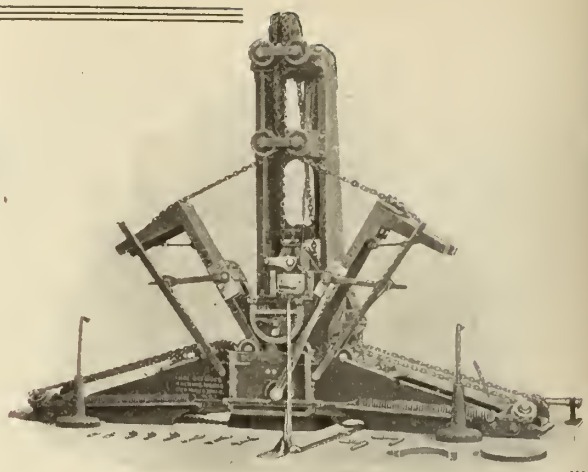
We Specialize on
CUSTOMS TURNINGS

Your order will receive prompt attention

THE NEW METHOD
EXTENSIVELY ADOPTED for BENDING

Steering Wheel Rims

This new Defiance No. 704 Steering Wheel Rim Bending Machine has established a new record. It will bend from 5,000 to 6,000 half rims, or from 2,500 to 3,000 complete rims, in ten hours. It saves a wastage of 25 per cent. to 40 per cent. in stock by permitting the rim strips to be cut close to size. Losses in breakage occur only where an inferior grade of stock is used.



No. 704 Steering Wheel Rim Bending Machine

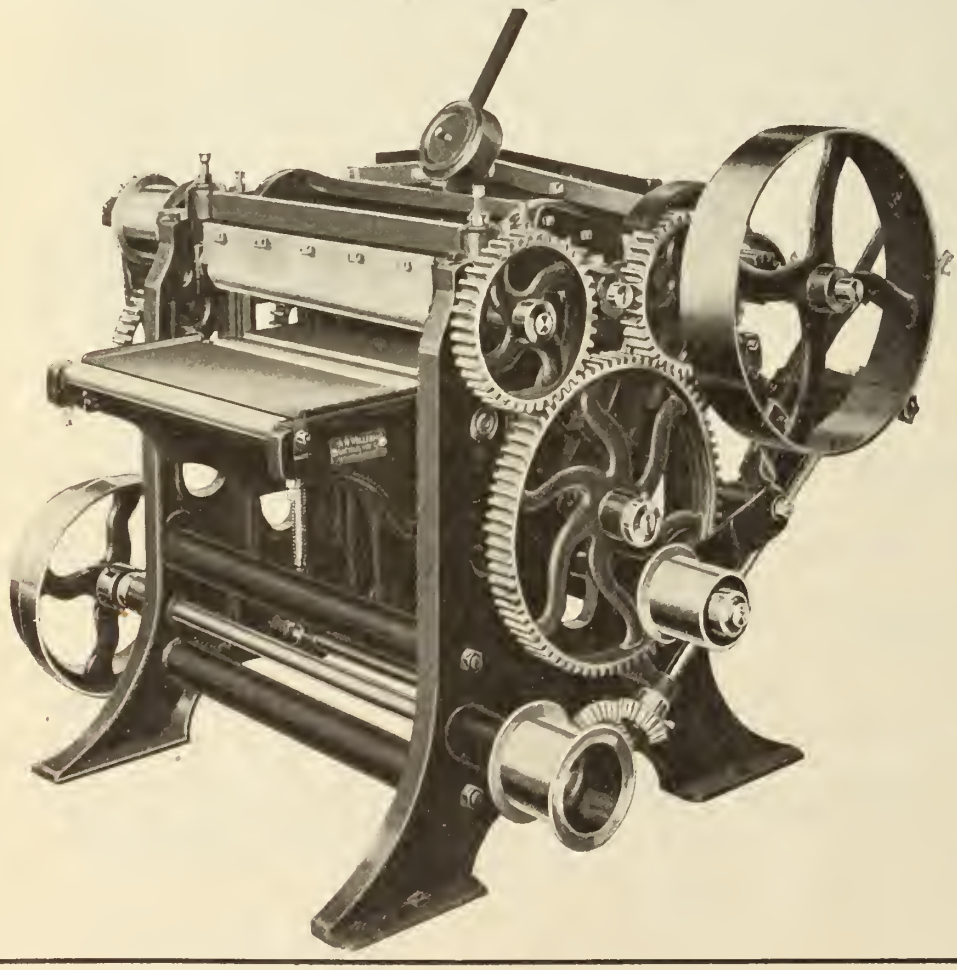
The Defiance No. 704 Steering Wheel Rim Bending Machine

The improved method of bending steering wheel rims. Although before the trade but a few months, it has been installed by nearly all the leading steering wheel rim manufacturers. It is used in connection with the Defiance Steering Wheel Rim Shaping Machines, Mitering and Equalizing Machines and Polishing Machines —all of which are proven successes and high productive machines.

Illustrated and descriptive matter on your requirements in steering wheel rim machinery will be mailed on request.

THE DEFIANCE MACHINE WORKS

New York City DEFIANCE, OHIO, U.S.A. London, Eng.



The "Eclipse" SURFACE PLANER

This machine is capable of producing the highest grade of planing and is especially suitable when very thin smooth work is required.

Over 2000 in use—

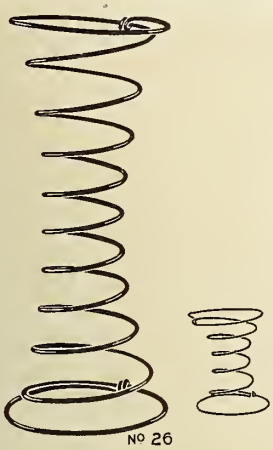
A splendid testimony to the **satisfactory service** which you get when you buy an "ECLIPSE." Write for illustrated circular.

The A. R. Williams Machinery Co. Ltd.
TORONTO - CANADA

BEST QUALITY

Upholstery Springs

from the most delicate pillow springs to the large comfortable seat springs



CANADIAN MADE FOR THE CANADIAN FURNITURE TRADE

Steele's Quality Upholstery Springs are tempered, and are guaranteed to retain their original height indefinitely. The line includes two cone springs, single cone springs with any finish on the small end, edge springs with round or square fronts, springs for loose cushions in barrel, two cone or straight compression styles, springs of special strength, knotted or plain ends.

YOUR PARTICULAR LINE

of upholstered furniture no doubt requires special springs. Refer your problems to us; our experts are at your command.

Helical Springs for Spring Bed and Mattress Fabrics

Canada's Largest Manufacturers of Wire Springs
Steel, Brass, Phosphor Bronze and Monel Metal

James Steele, Limited

Established 1885

GUELPH, ONTARIO - CANADA

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Brass Pulls—all the period designs, Desk Pulls, Label Holders, Card Index Rods, Hat Hooks, Desk Slides, Brass Sockets, Sliding Casters, etc.

Talking Machine Hardware

Lid Supports, Needle Cups, Needle Rests, Door Catches, Continuous Hinges, Sockets, Sliding Casters, Tone Rods, Knobs, etc.

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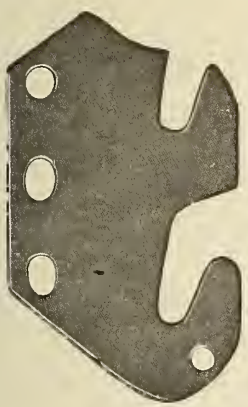
Jamestown, N. Y.

Pulls Knobs Escutcheons Toilet Hinges Commode Buttons Hooks Arm and Panholders Pans Desk Slides Casters

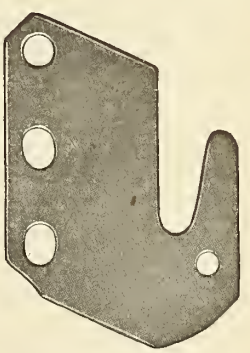
Screws Nails Brads Chair Rods and Bolts. Hanger Bolts Lag Screws

Tacks Twine Webbing Upholsterers Nails and Tools Tow Burlap Glue

We would like to sell You, too, your



Bed Fasteners



Heavy stock, steel clean finish, perfect shape, bright, smooth pins.

In fact they could not be better made and the PRICE is Right

NOBLIT BROS. & CO., Inc., Philadelphia, Pa.

Locks Keys Jack Chain Shelf Supports Springs Staples Sand Paper and Cloth Seats Benches Clamps Dowels

Choice Red Gum
America's Finest Cabinet Wood

There are great possibilities in Red Gum for the manufacture of medium and high priced furniture.

We specialize in the production of properly dried Red Gum Lumber—noted for its soft texture, beautiful figure, and good width.

The test of Red Gum is its condition after you have had it for a while. Buy from us and you'll find it uniformly right in all respects.

We also manufacture Southern Hardwoods, and solicit your inquiries.

Paepcke Leicht Lumber Co.

111 W. Washington St., Chicago, Ill.

ROBT. BURY & CO., Canada

LIMITED

Hardwoods and Veneers

LUMBER

Mahogany (250,000 ft. in stock, all kinds)
Walnut
Qtd. White Oak
Plain Red Oak
Poplar
Gum
And all U. S. A. Hardwoods

Birch
Basswood
Maple
Beech
Elm
Ash
And all other Canadian Hardwoods.

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SAWN

Qtd. White Oak
Qtd. Red Oak
Plain Oak
Mahogany (all kinds)
English Oak
Teak Ash Cherry
Vermillion Birch
Poplar

ROTARY CUT

Birch, Poplar, Ash, Gum, Walnut, Basswood, Maple

SLICED

Mahogany, Walnut, Figured Gum

We also Specialize in

Teak, Vermillion, English Oak, Three Ply, Inlays and Crossbanding.

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455 King Street West, TORONTO

Lumber Yard and Mill
Foot Spadina Ave., TORONTO

Eastern Branch Yard and Veneer Warehouse — 350 Beaumont Street, Montreal

Canadian Woodworker

A Monthly Publication in the Interest of the Woodworking Industry.
Reaches the factories producing interior finish, doors, sash, flooring, woodenware, furniture, pianos, boxes, and general mill products.

Subscription, $1.00 a year; foreign $1.50.

Woodworker Publishing Company, Limited

Branches: Montreal, Vancouver, Chicago, New York, London, Eng.

345 Adelaide St. West, Toronto
Phone Ade. 2700

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Vol. 17 November, 1917 No. 11

Don't Keep Your Ideas to Yourself

The editor recently paid a visit to several of the furniture and woodworking towns of Western Ontario and would like to remark here that the manufacturers of these towns are to be congratulated on their broad-mindedness. Without an exception we were welcomed cordially by the management and shown through the plant.

The features of the manufacturing processes were pointed out to us, and our attention was directed to any piece of equipment or any operation that was of special interest. It was a case of "if you see any ideas here worth taking, help yourself." Several manufacturers made very pleasing remarks about the "Canadian Woodworker," one of which was: "You people get the practical material. I get most of my ideas from your journal."

The reason we are able to publish practical information is largely due to the co-operation of manufacturers such as those just mentioned. This co-operative spirit speaks well for the future of the woodworking industry in Canada.

In contrast with this attitude is a recent experience with the makers of a wood novelty. They would not consent to give out any information, although they stated that they were only supplying about three or four large customers and found it impossible to keep up with their orders when working to the capacity of their plant. We have no desire to criticize their policy. They were the originators of the article, and if they feel they are entitled to keep the manufacturing processes a secret, we respect their feelings.

It is doubtful, however, if they are doing the wisest thing. The distribution of information benefits every person, and not least the distributor. It adds to the national wealth, and is available for all. The person who gives out ideas generally finds that he gets more in return than he gave.

The man who fails to use his talents for developing ideas will find those talents decay. If he originates one idea and then worries himself gray-haired jealously guarding it from "the other fellow," he will find his well of ideas dry up. It is a fact that the more we exercise our brains the more we are able to take from them. The furniture designer never runs out of ideas. The more he designs the more he is able to design. The same applies to the mechanic. If you have a good idea, give it out. You will benefit, the other fellow will benefit, and the industry as a whole will benefit.

About Dry Kilns

A few weeks ago we had the pleasure of discussing several very interesting phases of the woodworking business with the manager of an Ontario furniture factory. One of the topics to come up for discussion was the kiln-drying of lumber. This manager's ideas on this subject open up an interesting channel of thought.

He said the more he thought the thing over the more he was convinced that it was not so much a question of drying the lumber absolutely dry as it was to know what percentage of moisture to leave in it to stand up to the various atmospheric changes. This manager contends that almost any dry kiln, provided it is in good condition, will dry lumber if reasonable care and judgment are exercised in its operation.

He further stated that lumber can be dried so that when it is made up the furniture will give excellent service in one part of the country and yet when shipped to another part, where the atmospheric conditions differ, it will probably be a physical impossibility to move the drawers, etc.

Shortly after talking to the manager referred to above, another furniture factory was visited. Almost the first remark made by the owner was: "I want you to see my new dry kiln." After inspecting the kiln we returned to the office, and the manufacturer produced some test pieces of wood and proceeded to demonstrate the features of the new kiln. One of these tests consisted of spitting on the end of a short block and blowing the moisture right through.

The feature of the kiln, as pointed out to us, was that it extracted all the moisture from the lumber without altering its dimensions. In other words, the lum-

ber would not shrink when dried, nor expand when it absorbed moisture.

Our thoughts immediately turned to the previous conversation with the other factory manager. This appeared to meet his difficulty of getting his lumber in such condition that it would stand up under varying atmospheric conditions.

There are a number of dry kilns on the market, and we would strongly recommend that manufacturers having difficulties with kiln drying get in touch with these firms and go into the matter thoroughly. In the majority of cases these firms have men on their staffs who understand the kiln drying of lumber from A to Z. In many cases they will know the requirements of your business, and may be able to offer you suggestions. If you can show them that you know your business and know pretty near what you want, it will be a pleasure for them to talk to you.

Almost without exceptions, the salesmen of to-day who are presenting worth-while propositions are men who do not depend on a "line of talk" to sell their goods. They delight in finding a man who is open to conviction, and they will give you good, sound reasons why their equipment will give you satisfactory service. If one man's reasons are not sufficient to convince you, probably the other fellow's will be. The decision rests with you, and if you have used your best judgment in weighing the various points in favor of each kiln there is no reason to doubt but that you will get equipment that will give service.

The firm whose kiln was mentioned above stated that for years they had obtained only mediocre results in the kiln drying of their lumber. They had never been able to get enough dry lumber ahead to cut up their stock to advantage. We found them happy and as enthusiastic over their new kiln as a boy with his first pair of skates. Are your kiln-drying results making you unhappy?

Giving Credit to Employees

While it is better to work conscientiously and from a higher motive than hope for financial reward, it is certain that worth-while employees who take a vital interest in their work will reap a fair return in cash. But esprit de corps means team work also. It means a full staff working together for a common object.

To instil this feeling into a force of employees the head of the concern must do his part to cultivate it. He can do this by noting and appreciating the efforts of his employees. If they are lazy or turn out bad work he is sure to notice it and tell them about it; but, on the other hand, very often he has a strong objection to commending their efforts when they turn out good work.

Some large establishments make it a practice to offer rewards to employees for suggestions, paying from one dollar upwards for any that may be worth adopting in the factory. Some firms have a standing offer of a certain sum, say, five dollars, for the best suggestion for the month. They then pay, perhaps one dollar, for any others that may be used. Boxes are usually placed about the factory and printed forms provided for the convenience of those wishing to make suggestions.

In this way the employees are stimulated to think of improvements for the operation of the plant, means of saving money in running affairs, and the various other matters that are of interest to their employers.

It is said that the great profit in this method is that it causes the helpers to observe and think of the business and of ways for its improvement. As the opportunity to win a prize is open to all, down to porters and office boys, it gives an equal chance to all. In this way the humblest employee in the establishment has a chance of attracting his employer's attention and thus securing recognition for his loyalty and ability.

If it required the ordinary course of events to bring these persons to the attention of the man higher up, he might never learn of the existence of some members of his staff, since in many cases heads of great concerns do not meet those in subordinate or minor positions. With such incentive to effort, those who have any ambition more than merely to draw a specific wage for a certain number of hours on duty have an opportunity to identify themselves to the big men who otherwise might never know them.

Many persons are animated more by a desire to serve the company, in which they take great pride, than by the hope of financial reward. The individual who is proud of the business in which he is engaged and who does his best to serve it to the best of his ability will not only ennoble himself in so doing, but he will also find it profitable through increased pay and advancement in position. The employer who can convince his men that he regards their labor as important and takes an interest in the men themselves is more assured of faithful service. Thus it pays both master and man to cultivate an esprit de corps.

The Business Press

Recently Governor Whitman of New York State broke several engagements and travelled all the way to Chicago to address the Associated Business Papers of the United States and Canada. He said he did so because he regarded the business press as the established channel of business information, and, as New York State is the largest business and financial centre of the world, he desired to place the views of big business of New York before the business interests of the entire United States.

The business press of Canada has been quietly performing great work for Canadian manufacturers, business men, and financiers since the war broke out.

Room for Improvement in Wood Toy Design

Manufacturer Says Some Toy Makers Have Shown Lack of Taste—Unattractive Product Costs More Than Good Designs

A manufacturer of wood novelties who has followed the toy industry very closely since its inception in Canada, and who has made one or two lines of toys himself, is responsible for the statement that Canadian manufacturers of wooden toys, with few exceptions, are showing a decided lack of taste in the design of their product. This manufacturer prophesied that unless this state of affairs is remedied toy-making in Canada will be short-lived. His thoughts on the subject of toys are interesting.

He states that toy makers are too much inclined to the belief that anything odd or unusual will appeal to the tastes of toy buyers. In his opinion this is a mistaken idea. He says:

"When we take into consideration the class of people whom toy makers are catering to—future architects, legislators, doctors, and lawyers—the designing of toys should be given a great deal more consideration than it has received in the past. When a boy is playing with his blocks or construction toys, ideas are being formed in his mind that will stay with him through life. Careful consideration, therefore, should be given to the subject of toy design in order that the right impressions may be created in the child's mind.

"This idea is striven for at school, and why should it not receive attention in the design of the playthings that the child is to use in his leisure hours. There is no better judge than a child as to whether a toy is rightly or wrongly designed. While he may not be able to criticize the article and tell what is the matter with it, if it does not suit his taste he will quickly discard it. It is interesting to watch a child when he or she plays with a toy. If the toy is of the mechanical description, as soon as the secret of its movements have been discovered it is thrown away. On the other hand, with a good construction toy, when the child is furnished with illustrations of structures which may be erected, he will puzzle them out for hours at a time, until he succeeds in making the structure look like the illustration. If he is not able to do this himself, he will worry some adult to do it for him and then will attempt it himself.

Unattractive Toys Soon Discarded

"The same remarks apply to girls. Provide them with an attractive doll and some well-made doll's clothes and hats and they will spend many an hour dressing and rearranging the doll's clothes. If the clothes have been tastily made, this undoubtedly conveys impressions of good taste in clothes to the child's mind. The same is true of toy furniture, such as dining-room suites, bedroom furniture, kitchen cabinets, etc. Girls will amuse themselves by the hour arranging and rearranging the furniture in the various rooms.

"Crude and unattractive toys soon find their way into the discard, and the person who purchased them will usually make a mental vow that 'they will buy no more of that trash.' The main thing in the toy business, then, is to avoid manufacturing 'trash.' The blocks for constructing houses or buildings should be given almost as much care in the design as is bestowed on the drawings for properly-constructed houses. The main point here, besides providing amusement for the boy, is to create proper impressions in the young mind. Simplicity in design should be emphasized. Care should be taken to observe that correct lines and proper proportions are followed.

"In figured toys, such as animals, the natural lines should be followed carefully. This can be done without adding greatly to the cost of production. An ugly figure of an animal will remain on the shelf neglected when a true representation of the animal would give the child a great deal of pleasurable enjoyment. Very often the crude designs cost the most to manufacture. A typical example would be a band-sawed horse where the lines were incorrect and the wood used too thick. There are a great many of these clumsy, unattractive animal toys on the market.

Ugly Toys Often Cost More to Make

"Compare this kind of a horse with one where the outlines are correctly drawn and an attractive lithograph showing the proper color of the horse and the various parts of the harness has been pasted on to a thin piece of wood. Put two of these horses alongside of each other and see which one a child will choose. Yet the clumsy band-sawed one would likely cost more to produce than the one with the lithograph.

"The same remarks apply in some measure to toy vehicles, although this line has been better taken care of than some of the others. The following gives an idea of how two different manufacturers may fare in the designing and making of toys: Recently a friend who was thoroughly experienced in the toy business entered into negotiations with a woodworking factory to have certain machine work done, the finishing of the toys to be done at the party's own shop. After two or three lots had been machined at the woodworking factory the owners decided to steal the toy-maker's ideas and put out a line for themselves. They, therefore, refused to do further machine work, but immediately proceeded to put a line of toys on the market themselves.

"Their attempt was pitiful. If, instead of stealing the man's designs, they had suggested to him that it might be profitable for both parties to get together and manufacture a line of toys, the results would have been much different, not to mention being much more honorable. On the one hand was a clever designer with experience in the toy business and on the other hand a woodworking firm with facilities for turning out the wood parts. The combination would have been ideal. As it was, the lack of skill on the part of the woodworkers made them a failure in the toy business.

"Well designed toys will find a ready market any time, while crude ones are a drug on the market. The well-designed ones take less lumber to manufacture and are much more desirable to manufacture in every respect."

Art in Toy Manufacturing

The matter of design for wooden toys has recently been gone into to some extent in the United States. A recent writer in the Evening Post, speaking on the subject, says in part as follows:

"To assist the imagination to a certain point and to remove the props, allowing the imagination to soar upwards like the airplane, which soon leaves the

ground on which it gains its impetus—this is the magic which the real work of art and the real toy both accomplish.

"So it is that primitive art has often a greater lure than the most cultured output of academy and civilization, and so it is equally true that a little negro nurse set to entertain her white charges can rig up toys from a piece of wood and string which will find favor.

Much of Detail Omitted

"In the United States the manufacturing firm which seems to have carried furthest the theory of the toy which suggests but does not explain all is one whose regular business is that of theatrical scene painter. As this studio has entered the toy business in an entirely experimental mood, and is unbound by the traditions of just what toys have looked like, which more or less influence the professional toy-maker, some very charming and original toys have resulted. They are made of wood in the shapes of dogs, lions, doll houses, automobiles, and characters from fiction, but the designs are fanciful rather than realistic.

"There is a Noah's Ark, with its little conventionalized animals, which, nevertheless, are more interesting characterizations than are found in many full-fledged paintings. At the same time there is scarcely any detail; the thing is accomplished with a silhouette and a few splashes of paint, and realism is sacrificed to suggestion. Wooden figures of Robinson Crusoe and his Goat and Man Friday, which are not photographic copies from a book illustration, but rather such rude images as Friday himself might have carved and painted with dyes squeezed from a tropical plant, are symbols rather than dolls. And yet they are pleasing from the decorative side as well. They are designed by a competent poster artist who is responsible for a large number of the toys.

"But the artist is merely employed to make the design. The actual manufacturing is in the hands of mechanics. This fact marks the significance of the experiment in the toy industry, for the hand-made toy will never become an important business in this country, since child labor is frowned upon. Therefore, the craftsmen who furnish the charming and often truly artistic toys of the exclusive gift-shops will never exert a great influence on the industry in general. On the other hand, the wooden toys, cut out by mechanical processes and painted with stencils instead of with brushes, may have a far-reaching effect, if they prove as successful financially as they have artistically.

"The basic idea on which they are founded is that children instinctively see with the simplicity which training gives to the artist. The children cannot read Clive Bell and talk highbrow stuff about 'significant form,' like our little group of serious thinkers, but they are guided by the same general principle which the 'Futurists' are working on. When a child has seen a monkey he remembers the way the monkey sits and scratches and the fascination of the long, curving tail. It is really a caricature of the creature which the brain of the little child has registered, and this caricature becomes a toy.

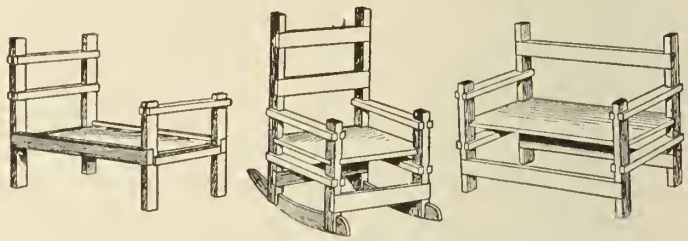
"Again, supposing that a very small boy has just made the acquaintance of Captain Kidd and of oceans and of planks and of treasure islands, the picture which he has absorbed of the wicked gentleman is concerned with two things—a vicious leer and a knife. He can be a Captain Kidd himself with perfect ease, with a painted moustache and a kitchen paring knife. One small boy of my acquaintance could be King Arthur all day long with the simple addition of an ex-lard bucket for a helmet, and feels hardly more martial now in khaki. So the Captain Kidd toy features knife and moustache and snappy orange color—and the details may walk the plank."

New Line of Toy Furniture

The accompanying drawings illustrate a new line of toy furniture which has recently been placed on the market by a United States manufacturer. This is something different in a construction toy. All parts of the furniture are machined to fit into each other snugly, no pins or screws being required. Many different articles of furniture can be constructed from the pieces supplied.

This idea is worthy of being taken up by Canadian toy manufacturers. Besides providing a fascinating pastime for the children, it directs their thoughts to furniture. Elsewhere in this issue an article is published which contains the suggestions of a manufacturer regarding the toy industry in Canada. He points out that considerable thought should be given to design by the manufacturer of construction toys.

We believe the line illustrated herewith is along



Toy furniture that comes apart

the right line. Undoubtedly the point that would appeal to the child is that the various articles can be taken apart and the pieces used to construct other designs.

Back-Fire in Sawdust Furnace

Recently a back-fire from a boiler furnace in a box factory located in the United States resulted in serious injury to two of the boiler-room hands, one of the men being so badly burned as to necessitate his removal to the hospital.

It is supposed that the back-fire was caused as follows: Factory refuse, consisting mainly of pine shavings and sawdust is used at this plant for fuel. The refuse is blown to a large bunker over the boiler-house furnace, whence it is fed to the furnace of each of the two 450 h.p. water tube boilers through ducts connected to the middle of the furnace front. Provision is also made for hand-firing, through three doors in each front, from a supply of refuse dumped on the boiler-room floor.

The supposition is that with the stack damper nearly closed, fine sawdust had piled up almost to the top of the furnace, and that this was followed by a deluge of planer chips and shavings, which acted to blanket the mass of sawdust, and thus prevent ignition of the gas that was being evolved. It is presumed that in this way the combustion chamber and passes of the boiler setting became clogged for the time being with gas and remained unconsumed for want of sufficient oxygen. When ignition finally did take place there was an explosive combustion that shook the entire boiler structure, blew open the furnace doors, and enveloped the two attendants in a sheet of flames.

Practical Discussion on Sanders

Writer makes suggestions regarding the care and operation of these machines—Good results can be obtained by wise selection of papers.

By F. E. Tracy

Sander care and operation begins with the installation. Don't start the new machine off at top speed and expect things to run smoothly. You are justified in expecting greater capacity than your old machines gave, but first limber up your new machine the same as you would your new automobile.

When unloading the new machine be careful that it is not jarred when "jimmied" across the floor. Drum sanders are complicated and have delicate mechanism. Be sure that the entire base rests evenly on the floor, and don't line up with the power shaft by eye.

If the new machine is of a type that has not been used in your plant, have your operator learn its operation before working on it. The manufacturer often sends a man who will teach the old operator all he needs to know. In this connection it is very necessary to know all the oil holes, as some are placed out of sight.

As stock comes from the surfacer to the sander and from the sander to the finishing room, the sander should be placed midway between these two on a floor that will not develop vibration. Follow the instructions attached to the machine as to belting, etc., so as to get the proper drum speeds. Also remove all grease from the feed rolls and bed with gasoline or naphtha before starting the new machine. The makers smear grease on the new machine to keep the parts from rusting during shipment. But unless this is removed, stock will stick under the drums because of the slipping rolls.

Adjustments Must Be Correct

The drums, rolls, and bed must all be kept in perfect line. No adjustment is more important than another—as imperfect alignment anywhere develops faulty work. Bed plates, etc., are set by means of a long straight-edge. Pieces of paper are placed under the edge on all bed sections. When all pieces of paper are uniformly tight the parts are level. This leveling is done from each side of the machine, so that when one side is level, setting up the other side may "throw it out" again, so that four or five levels must often be taken. The lower feed rolls are adjusted and then the others are adjusted to these. These rolls should be but about a 1/64 inch higher than the bed. The upper rolls, drums, and pressure rolls are set the same way. The drums should be just low enough so that when working over stock they can be stopped with pressure of the hands. Be careful in testing this pressure, as the drums are liable to carry the hands over too far and sand through the flesh. If the drums are too low the pressure will stretch the felts so that they will become loose, and a loose felt means loose paper, and that means rapidly worn grit and ripples in the stock.

In putting on the paper over the felt be sure no dust or grit is stuck to the paper side of the sand roll, as that would cause streaks in the work. Each change of paper costs but a little. It's expense, therefore, does not seem great. But it is the little expenses which come often that count big in the end. So don't try to make a planer of the sander. Big capacity tools often fall short in output because of faulty feeding methods. Be sure your truck is not too far back or to the side. When it is, the greatest loss of time occurs when running small stock, as the shorter it is the more time required to handle it.

Don't feed small stock across the bed with a lot of space between each piece. This wastes half the machine's capacity. You don't even gain full capacity by feeding the pieces close together, using one hand to place each piece. The better way is to have the stock evenly piled on the truck, so that it can be picked up with both hands and dropped on the bed two pieces at a time. In hopper-feeding, set up all your piles first; then it is easy to keep each replenished. The same general rules apply in removing the stock. Don't pick it up piece by piece unless it is big stock. Wait till the out-feeding table is full; then pile the pieces up at one motion.

Makers Provide for Play

What if you line up your machine and adjustments do not hold? In this case there must be play somewhere, and the machine makers have provided for this. But as play does not come until after years of work, the operator often is not familiar with its correction, and does not know what to do. Lots of men will blame their machine, and be blamed in turn for poor work when correction of the fault would take but a few minutes. While working, the pressure rolls are forced up so that there is heavy wear at the top of the boxes. In time this wear will allow play. This play is not noticed when lining up, of course. However, under the top pressure roll boxes there is an adjustable block, which forms part of the bearing, so that all wear is quickly taken up by turning a set screw, which forces up these blocks.

Keep drum bearings and adjustable parts of the oscillators snug. A loose drum or lost oscillator motion causes waves to appear in the stock because of the jerky motion.

Very little trouble is caused by the bed plates. Once set they seldom need be touched. However, a set screw may work loose. If it does, dust will work under, throwing the bed out of line. Don't tighten the screw, in this case, until you have cleaned out all foreign matter.

On the endless-bed machine torn pads are caused by a number of things. But the causes most frequent are feeding stock in tilted so that the edge nicks the rubber, and in having the drums too high so that the grit is not all cutting. In this case the operator thinks his bed pressure is not strong enough so that he forces it up too high. This results in terrific pressure on the pads. Take it for granted that these pads should not wear out frequently. But when they do, be sure to replace them promptly, otherwise you will have marked stock and not know where to look for your trouble, perhaps. If the cut is forced, the surfaces will be irregular. This shows up most on woods of uneven texture—the grit cuts deeper in the soft parts than the hard. The same trouble comes when feeding too fast or when drums are revolving too slow. Zig-zag marks may be caused by some foreign substance, such as a nail in the stock cutting the grit so that afterwards this place in the paper will not sand. The oscillator motion makes the zig-zag.

Loose paper will cause shallow depressions. Be sure to tighten up fresh paper after it has run a little while—the pull causes it to stretch at first. When the last idle roll is too low it will cause a depression close to the ends of stock as it leaves the last drum. On the other hand, if this drum is too loose the end of stock will be too thick. The ends of stock will be nipped or rounded off if one piece leaves the bed before another is inserted. For this allows the pressure roll to settle down so that the new pieces must force them up again. If stock is kept feeding the rolls are kept up continually.

Keep sandpaper in a dry, cool place. Heat or sunlight will dry the coating so that it is liable to crack when tightened around the drum, and this will loosen the grit. On the other hand, if the paper becomes damp the glue will become soft and loosen the grit. Quite a few operators use their worn paper to polish with. This is incorrect. On such paper the grit is dull, so that it rubs over the stock and hardens the surface rather than cutting it. A hard surface tends to keep the finishing liquids from penetrating, so that the finish will be too light and soon wear off.

Try to sand woods of the same general texture with the same size grit. A different grit is required for hardwoods, softwoods, greasy woods, etc. So that where one set of coverings have to sand various woods the finish is not so good as is possible. Butternut and pitchy pine are very greasy. They soon slick up the feed rolls so that they slide over stock without feeding it. Some men do not think of this, and will set their pressure rolls down too hard. This marks stock and wears out paper quickly, besides straining all working parts. The same trouble may be caused by oiling up during operation. The oscillators will throw the oil over the rolls so that they cannot grip the stock sufficiently to feed it.

The grit on the first roll does the heavy cutting; that on the second roll smoothes down the ridges of the first cutting, and the third grit smoothes these down still further. The third drum is called the polishing drum, but to polish is to rub over, and this drum does not do this, but rather cuts very finely instead. Naturally the first drum must carry the coarser grit and the other drums proportionately finer grit. Where the proper sizes are used on average woods, the paper should last from five to ten hours. Garnet paper is preferable in the long run, because it is harder than flint. But as flint is sharper it is good for short runs on hardwoods.

Grits for Different Woods

No two operators use the same sizes of grits. It seems a case of every man for his own opinion. However, certain sizes are preferable on certain woods. Fir is fairly soft, but it is tough, so that a good combination to use on this wood is Nos. 2, 1, ½. North Carolina and Georgia pine, cypress, and all gummy woods require coarse paper, such as Nos. 2½, 1½, ½, as finer grades become clogged up. Circassian and burl walnut, rosewood, birch, mahogany, and other cabinet woods require fine grades with No. 00 on the last drum. Elm, whitewood, basswood, white pine, poplar, and other soft woods cut easily under fairly fine grits. Baywood, Spanish cedar, and cherry cut easily and smoothly only when adjustments are very close and grits are sharp. Softwoods that have been kiln-dried become "dusty" during sanding. This gathers on the last drum particularly, so that the brush should be kept clean. Such woods as maple, having a uniformly close grain will polish well under fairly coarse paper. More oak is used in furniture making than any other wood, so the operator should understand that the open grain with hard and soft streaks, when quarter-sawed, requires careful handling. The grit must not be too fine or the pressure too heavy or the soft parts will be sanded deeper than the hard parts.

Another rather confusing thing is that different brands of paper are not uniformly graded, so that the operator must keep this in mind.

In sanding veneer take the time to change your paper to the finer grades. Otherwise much expensive wood will be cut through or scratched so deeply that the marks will show up in the finish.

The endless-bed machine is the only type of sander that successfully hopper-feeds stock. The bed acts as an automatic feed immediately stock is passed onto it. So by piling stock half over the travelling bed the pads grip each bottom piece and feed it into the drums. This is true on narrow or wide stock. Wide stock is taken care of by the resiliency of the rubber-faced bed, which takes up slight variations in stock thickness. It is this slight "give" that now permits dozen of rails, stiles, stretchers, fronts, and grills to be machine sanded at one operation instead of each having to be separately sanded by hand as formerly.

Advantages of Belt Machine

Convex and concave splats and slats, saddle seats, etc., must be sanded on the belt machine. Turned wood, with its sharp corners, etc., requires the double spindle sander, as being much more economical than hand work.

On the hand-block machine the operator must be very careful when he first changes to a different grade of paper. If he has been using fine paper, for instance, he must remember not to press so hard over the coarser grit. The joint of the sand belt must be very smooth, otherwise it will leave a mark at every revolution.

The advantages of the belt machine with the belt over the work, so that the grit is not worn by pulley contact, is that the operator faces his work and can note progress and results at all times. When sanding high boxes, etc., the operator should stand on a raised foundation, so that he can exert proper pressure without tiring himself. Parts must be kept oiled and free running, as pulling and pushing a heavy, hard-running table is very tiring. The standards on this machine should be set far enough apart so that the belt is sufficiently pliable to be easily worked over curved surfaces.

Altogether there are many more points to be considered in the care and operation of the various types of sanders, but if the ones above listed are observed the operator will find himself at least free from a good share of his old difficulties.

To Make a Strong Glue

For shops using glue on a small scale, and which experience considerable trouble with stock loosening at joints, I can recommend the following: One ounce of strong vinegar to each quart of cooked glue. When stock is not thoroughly dried, add one ounce of isinglass to same amount. This is an old recipe which I have found to work very satisfactorily.—J. W., in the Woodworker.

Profit Sharing in Woodworking Plants

Average Factory Can Turn Out 10 Per Cent. More Without Straining Itself—Sharing Profits Induces Increases in Production

In a recent article in The Woodworker, of Indianapolis, a writer deals with this subject as follows:

Now, I am an old mill man, but I am also an old-fashioned mill man, and I know less of modern business matters, perhaps, than many mill owners. However, I am pretty sure that I know human nature from the ground up to the last leaf; therefore, I can tell you that any man works far better when he has an end in view other than the daily wages of his routine work.

What I shall say in the way of suggesting a method of profit-sharing, please remember, will be purely suggestion. Each mill owner, of course, would find it suitable to him to make changes to fit in with his line, with his men, and with his degrees of profits. I am going to use round numbers here, for the sake of convenience.

Suppose, for example, I own a mill or factory that has been paying me, besides my salary of $150 per month as head of the plant, 20 per cent. on the investment; this, you understand, counting in the depreciation in value of machinery and all that. I have $20,000 in the business. At 20 per cent. this would pay a clear $4,000 per year as profit. I have twenty employees, and I decide to give them the profit on something like 15 per cent. of the amount invested.

Now, we will suppose I have twelve men who earn $1.50 per diem; four men who earn $2.50 per diem; two men who earn $3 per diem; one man who earns $4, and one who earns $5 per diem. Each of the $1.50 men gets the profit on $100, which is a bonus of $10 given twice a year. Each of the $2.50 men gets the profit on $200, which is a bonus of $20 given twice a year. Each of the $3 men gets the profit on $300, which is a bonus of $30 given twice a year. The $4 man, which is the foreman, gets the profit on $400, which is a bonus of $40 given twice a year. The $5 man, which is the filer, gets the profit on $500, which is a bonus of $50 given twice a year. You will note that the scale rises all the time, which is an incentive to the poorer paid men to work harder for a better job.

If you will figure this up you will find that I am paying my employees $700 out of what was my $4,000 per annum profit. I am here to tell you that my men will make more than twice that over what they would make without it. Besides, it will mean less expense—less broken machinery, less wasted oil and other supplies, and less loss of time; for will not my men themselves be losing when I am losing? Also, there will be less difficulty between my men and my foreman, and less trouble all the way around, because then there will be unity in my factory, a oneness, a case of every man pulling toward one common end.

We must not lose sight of the fact that a man may double his profits without doubling his output. Say, for instance, you are the owner of a mill that is cutting lumber at $4 per thousand feet. You must cut 20,000 feet daily to pay the bare expense, which includes wear and tear of the machines and saws. If you cut 25,000 feet, you are making a profit of $20 per diem; but another 5,000 feet daily doubles your profits! And I believe the profit-sharing plan applied to such a plant would turn the trick.

I would have iron-clad, unbreakable rules in connection with my profit-sharing plan. For one of them, any man who had not been with me for six months could not come in on my twice-yearly declarations of dividends. And there would be other rules that would materialize as the plan worked itself out and the necessity for them arose.

In my illustration, as you have doubtless noted, I have twelve common laborers. These, as you have seen, have not come in for as big a share of profits, relatively, as have the machine operators, foreman, and filer. Therefore, it might be well to pay these men just a little more per day, even 5 cents, than other and neighboring mills pay, in order to be sure to keep them. The thing desired above everything else is to get a crew of good men, wide-awake and interested men, and then keep them; and the profit-sharing plan, generally speaking will do it. Men who are accustomed to one line of work, as you doubtless know, will do better work, and vastly more work, than men who shift themselves here and there for no excuse whatever, as the common run of factory employees are forever doing. I don't mean sawyers, filers, and machine operators, you understand, though these do change positions often enough—which goes to prove that usually they are more interested, and naturally, in their wages than in anything else—I mean the fellows who tail machines and do other such ordinary work.

The curse, as any man knows who will go to the trouble to think it out, of ninety-nine out of every hundred woodworking establishments is mediocrity — plain, tiresome, routine. It is, of course, because the men who work in those mills and factories have outside interests, small though they be in comparison, that loom up larger to them than interest in the plant that employs them. These men are not to blame. It is the natural thing; you can't reasonably expect anything else. The remedy, and the only remedy, is to awaken an inside interest; to have the men interested as their employer himself is interested; to have them feel that they are working for themselves just as their employer feels that he is working for himself.

I am right here to tell you or anybody else that the average factory can turn out at the least 10 per cent. more than it is at the present turning out, if it wants to hard enough, and that may mean a doubling of profits. The best foreman, the best filer, the best sawyer, the best operator of any machine, will fall into a gait in spite of himself. And the day of gaits is bound to go, because efficiency is going to crowd it out. The world, practically, is to be rebuilt when the war is over, and largely of wood, and the race is going to belong to the swiftest, to the widest awake, to those who can see the farthest and do the most.

In the foregoing paragraph I say that the average factory can turn out 10 per cent. more than it is at present turning out if it wants to hard enough. I want to repeat that, and it can do it without straining itself in the doing. I have seen it tried, though with a motive power other than that which I am writing about. Here is one case of it:

It became whispered in a certain box factory that the "Old Man" was going to give to each of his employees a cash present of $5 as a Christmas gift. This

was an even week before Christmas. That week those men turned out 20 per cent. more boxes than the factory had ever put out before!

I know that to be a fact—there is no guess-work about it; and conditions were not more favorable than usual. They did it because they were interested, and not because they had been lazy; don't you see They had a goal in view, so to speak; something to work to; therefore, they lifted themselves out of themselves, stepped out of daily routine, and accomplished something out of the ordinary.

Well, there's a little more to the story, and it may not come in amiss here. That "Old Man" decided that it would pay him if he raised the wages of his men 10 per cent. He raised the wages of his men 10 per cent., and it did pay him. It paid him for six weeks, or thereabouts. Then it became common; it became routine; it became merely the expected, and the output of this box factory fell back to the old standards. Then there was difficulty as big as a horse.

I knew two log band mills that were of the same size, that had been built by the same man, that cut exactly the same kind of timber, and that ran within two miles of each other. The average daily output of lumber on each mill was 26,000 feet. In the summer time these two crews had a fashion of working fifteen minutes extra each day in the week except Saturday, and on Saturday they finished their sixty weekly hours early enough in the afternoon for a ball game between their respective teams. One Saturday afternoon, after an unusually hard drubbing by the other team, one team rose to say to the visitors something on the order of this:

"You may beat us playing ball, but you sure can't beat us sawing lumber!"

"We'll show you with next week's cut," replied the winners.

The inspectors who tallied the lumber off the trimmer were men of unquestionable integrity, and there were no doubts shown here. That week's cut was a marvel for that pair of little mills. One of them averaged 32,000 feet daily and the other averaged 32,700, with the defeated ball team's crew in the lead. And a going over of the lumber by both crews revealed the fact that it was as well sawn as the lumber before it had been.

Why? Because the men were interested, and for no other reason. They were not doing humdrum, routine work; they were working toward a common end. And the difference was not, let me end my article by saying, due to any fault in the men; if there was a fault, it lay in human nature itself.

Electricity in The Furniture Factory

Possibilities of Disposing of Wood Waste to Better Advantage Than Using It For Fuel—Horse-Power Requirements of Woodworking Machinery

The advantages of the electric drive for machines in furniture factories are becoming generally recognized by operators of such plants, writes the Electrical Review. The advantages referred to are greater safety and economy, the constant speed that may be maintained by the use of electric motors, the greater freedom from breakdowns, and the higher production secured. The appreciation of these facts is attested to in the gradual replacing of steam-power equipment with central-station service. The greater number of such changes are made in factories having access to central-station service. It is easy to understand the position of the operators of a factory having good steam-power equipment, where the plant refuse is utilized as fuel for the boilers, and which in times past was considered a fuel free of cost. In more recent years, however, the sawdust, shavings, and cuttings from a woodworking plant are finding a profitable market, such material being in demand for packing, insulating, and wood pulp uses; and from them wood alcohol, acetic acid, and other products may be extracted. The continued use of steam power and the delay in adopting electric power in its place are caused in many cases by the availability of wood refuse for the boilers, and by the belief that this refuse would be discarded as waste if it were not used as fuel. When trade arrangements are once established for the marketing of this refuse at a profit sufficient to equal or overbalance its value as fuel at the plant, the principal reason for delay in putting in electric motors will disappear. Then, at plants in which refuse is used as fuel, it is observed that a certain amount of coal is required in addition to the wood waste. Each plant has its own problem, determined by local conditions, among which may be inability to reach a market for refuse and remoteness from electric-power service.

Figures produced by competent research men demonstrate the commercial possibilities in treating wood waste. The results are thus stated: "When properly treated, every ton of theoretically dry wood, or 3,200 pounds of green sawdust, will give:

30 gallons of 188 degrees alcohol at 40c	$12.00
76 pounds acetic acid at 6c	4.56
¾ ton of stock food at $23	17.25
Total	$33.81
Cost of production	7.00
Net value, per ton, dry wood	$26.81
Net value of product, per ton, green wood	16.80

"One and a quarter long tons, equivalent to about 1,000 feet of lumber, when transformed into above products, has a value of $33.51. Assuming that it requires two tons of wood to equal one ton of coal in heating value, and that the net return from above process is $10 per ton, it is evident that sawdust is not the inexpensive fuel which it has always been considered."

The above illustration only serves to show the value of products that may be made from wood waste, and that this source of revenue may well be considered, especially by factory operators whose wood refuse amounts to 50 to 100 tons a day. Making due allowance for practical results of extraction falling considerably below the theoretical, these figures appear to show conclusively that if steam be supplanted by electric power there need be no loss and no waste occasioned by not using the mill refuse as fuel.

Putting aside the question of power costs, there are other considerations in favor of the electric drive for furniture factories which are real advantages that make for safety, economy, and speed in production. In plants where electric power is used it is always possible to set the machines to the best advantage for

operating, and with regard to the economy of floor space, and under such arrangements the motors may always be made adaptable. In steam-driven mills such advantageous installation of machines is seldom possible, because transmission of power often forces the setting of a machine in a position not otherwise desirable. The output of a mill is sometimes curtailed by reason of not being able to adjust machines and to use floor space to the best advantage. With motor drives the machines may be placed to face any direction suitable for the work and as regards light and floor space.

The safety of employees is of paramount consideration, and rates for liability insurance reflect the conditions of greater safety that prevail in a modern factory having the electric drive. In these times adequate safety appliances, as well as high wages, are demanded by the best class of workers.

In order to meet existing competition the manufacturer requires reliable power, constant speed, and steady operation, all of which are best attained through the use of the electric drive. Some motors are so constructed that constant speed, from no load to full load, may be maintained, securing steady operations under those varying conditions. Then, if one machine or one motor should be out of service the operations of the others may continue without interruption. The upkeep costs of operating woodworking machines are high, which is due to the necessity for having high-speed machines with high belt tensions, causing heavy wear on belts and bearings. In order to arrive at upkeep charges the loss of production during time of making repairs must be added to the repair costs proper; and it is evident that the losses occasioned by breakdowns amount to no small sum.

The electric drive in furniture factories secures greater cleanliness and minimizes the fire risk. The adaptation of electric power to such plants may be by means of the individual motor for each machine; or the group drive, in which several machines are driven from one motor through a short line shaft; or by means of a combined individual and group drive. Manifestly, the higher load-factor and low first costs are attained through the arrangement last named. While the large machine is always operated by its own motor, the small machines are usually grouped to good advantage and driven by one motor. This makes a flexible condition, as all machines are not necessarily operated continuously, and the one motor used need not be equal in capacity to the combined capacity of all the machines. A case may be stated of five machines, each requiring a 5 horse-power motor. If all were operated at the same time, the peak of the load, or maximum power requirement, of all will not come at the same time, nor be continuous; so, instead of installing five motors of 5 horse-power each, or one of 25 horse-power, it is shown that a motor of 15 horse-power may serve the purpose. Such an installation, under a group-drive arrangement, economizes in both cost of equipment and of operating. In some cases of an individual motor for a large machine, the motor and machine are direct-connected through couplings. Belt connections are usual for planers where power is delivered to the machine at more than one place. Modern woodworking machines are now so designed as to adapt them to the electric drive, and in some cases the machine is constructed with a motor as an integral part of it. This kind facilitates matters where a new installation is being made.

In making a change to fit old equipment to electric power the problem of securing motors of sufficient capacity, but not so great as to make unnecessary expense, usually requires skilled attention.

Below is given a list of woodworking machines in a typical furniture plant, with the motor capacity required for each machine or group of machines, all motors designated being 3-phase, 60-cycle, 220-volt:

1—5 h.p. motor, group drive for 1 double cut-off saw, 1 No. 1 spindle shaper, 1 No. 1 carver.

1—7½ h.p. motor, belted direct to large sander.

1—1 h.p. motor belted to line shafting to 1 small emery wheel, 1 12-in. wood-turning lathe, 1 filling machine.

1—2 h.p. motor belted direct to 1 single-spindle shaper.

1—2 h.p. motor belted direct to 1 38-in. band saw, 1 small jig saw.

1—1 h.p. motor, belted direct to 2 double-spindle boring machines.

1—5 h.p. motor, belted to line shafting to run 1 24-in. planer, 1 freight elevator, 1 small boring machine.

1—5 h.p. motor, belted direct to 1 16-in. jointer, 1 24-in. blower.

1—2 h.p. motor, belted direct to 1 12-in. jointer.

1—3 h.p. motor, belted direct to 1 rip saw.

1—3 h.p. motor, belted direct to 1 No. 20 swing cut-off saw.

1—3 h.p. motor, belted direct to 1 belt sander.

1—2 h.p. motor, belted direct to 2 belt sanders.

1—3 h.p. motor, belted to counter shaft to drive 1 swing cut-off saw, 1 rip saw.

Jointing and Grinding Knives

By J. P.

The reason commonly given for the modern fast feeds in planer and matcher work is the adding of more knives to each head. This, however, is only part of the reason. A modern machine, fitted with round heads, carrying six or eight thin steel knives, does not give any guarantee of smooth work at feeds ranging from 200 to 300 ft. per minute unless one or two other things are considered.

Every knife must be in action. All knives must cut, and cut alike. In order to accomplish this, perfect knife balance is required; also careful grinding and setting. In order to obtain a true cutting circle, careful and light jointing is also necessary.

Fitting up heads for fast matchers is a mechanic's job, and should be given to none but a real mechanic to do. To do this job properly requires a man with a good eye, good judgment, and an accurate sense of touch. Also if good work is expected, sufficient time must be allowed and the proper facilities provided for its accomplishment.

Every mechanic knows the function of knife-jointing—that it is intended to bring the knives all into a single cutting circle. Jointing is sometimes taken advantage of, however, to cover up careless or hurried knife-setting. Some men figure that it is wasted time to be too careful in the setting of knives when they have to be jointed afterwards.

This is a fallacy, and is sure to cause a great deal of trouble in knife work. In the first place, it often requires prolonged and heavy jointing to bring the knives into a true cutting circle. This develops a thick heel on the knife, and a knife in this condition will pound and cause very uneven work. The heavy heel can be ground off with an electric head grinder, but,

even so, there is a great chance of throwing the knife very much out of balance.

Poorly balanced knives cause wavy finish, together with jarring and pounding in the journal bearings. It will be evident, therefore, that nothing is to be gained by slighting or hurrying over the preliminary work—the balancing, machine grinding, and knife setting.

To change knives requires considerable time when done properly Therefore, instead of changing the knives as soon as they show a heavy heel from repeated dulling and rejointing, it is now customary in numerous up-to-date planing mills to resharpen them right on the head with a head grinder. This is a small abrasive wheel, which travels back and forth on parallel ways and is belted or connected directly to a motor. This resharpening consists of grinding off the excessive heel.

The number of times the knives can be resharpened in this way depends on how far they were set out beyond necessary clearance at the start. Usually 1/16 inch is the distance, plus ordinary clearance. Resharpening knives on the head not only saves time and labor, but it prolongs their useful life, because they are not jointed so often nor so heavily. Jointing is seldom required after resharpening, but it is always necessary after setting the knives.

Market for Wood Products in England

Extracts from Report of Special Trade Commission—Opening for Broom Handles, Dowels, Wood Turnings, Etc.—Canadian Goods Popular

The following extracts from a report issued by a special trade commission which was appointed by the Minister of Trade and Commerce to visit Great Britain, France, and Italy will no doubt be of interest to a number of our readers. The commission made extensive enquiries to ascertain the possibilities of developing Canadian export trade. The lines of woodenware for which there is a market in Great Britain are enumerated below, together with the remarks of the commission:

Broom Handles.—In 1912 an average of 3,400 gross were imported per month. About 1,200 gross came from Scandinavia, 700 gross from Finland, 1,100 gross from the United States, and 400 gross from Canada. Canadian and American handles are preferred to others, inasmuch as the wood used is more suitable. Importers will pay slightly higher prices for Canadian handles. The average price in 1914 was about $2.90 per gross, or $118,800 per year. The sizes of these handles were 50 in. x 1½ in. x 1 in. They were of first, second, and third qualities, and were packed in one half-gross or one gross bundles. Canvas wrapping is preferred.

Dowels.—In 1913 about 68,000,000 pieces entered Great Britain, 13,000,000 from Austria, 14,000,000 from Scandinavia, 32,000,000 from the United States, and 8,000,000 from Canada. The Austrians had gradually been increasing their exportation up to the outbreak of the war, but on account of their not having any other timber available but beech, which is not suitable for all classes of dowels, their sales were limited. Scandinavian timber is most unsuitable, and their goods have always been sold as second quality. They were cheaper than the United States or Canadian product, but the goods were not sold in large quantities. United States manufacturers specialize in the dowel business, but Canadian manufacturers could probably compete to advantage if they were organized for export business. When Canadian dowels are imported they give every satisfaction. The average value of dowels imported to Great Britain in 1913 was about $4.80 per thousand, or $34,000 per year. The dowels were packed as follows: 3/16 in., 1,000 per bundle; 1/8 in. to 5/16 in., 500 per bundle; 3/8 in., 7/16 in., and 1/2 in., 200 per bundle; 9/16 in., 5/8 in., 11/16 in., and 3/4 in., 100 per bundle; 7/8 in. and 1 in., 50 per bundle.

Wash Boards.—The average importation has been about 1,800 thousand per month—50 per cent. from Scandinavia, 20 per cent. from Germany, 20 per cent. from United States, and the balance from Canada. The reason why Canadian manufacturers have not been able to compete is that the Swedes use the Augenter Brissel machine for the corrugated parts, which the Canadians have not yet introduced. The machine has so far been made under a German patent. The average price per thousand for these wash boards is about $1.08, or $23,400 per annum. They are packed in bundles of 1,000 by nailing battens on each side.

Clothes Pegs.—These goods are only made in the United States and Canada for the reason that timber grown in other countries is not suitable. It is considered that the United States has 80 per cent. of the trade. The average yearly imports have been 902,777 gross, at 48c per five gross case—in all about $90,275.

Skewers.—While this article is not very profitable to the manufacturer, large quantities are made in the United States, and to a certain extent in Canada, the reason being that it is necessary to use maple or hickory, and these woods are not grown in other countries.

Cabinet Turnery.—Up to now Canada has not exported very much of this class of wood product, but there is no doubt whatever that we could do a large and profitable business in this direction. Under this heading may be included Windsor legs, forefeet, spindles, couch, and table legs. These goods are usually imported from Austria, Scandinavia, and Finland.

Brush Turnery.—Norway and Sweden have practically all this trade. Some eight years ago one or two Canadians tried to compete, but were unsuccessful. Within the last year or so prices have risen enormously, and it would appear that there is a good opportunity for Canadian exports in this class of goods. The field is large, and almost any kind of wood may be used.

Pastry Boards.—Canada has a fair share of the better class trade on account of having the most suitable timber—basswood. The cheaper boards, as produced in Germany and Sweden, can easily be made profitable.

Tool Handles.—File and chisel handles made from beech, birch, and ash mostly come from Germany, Scandinavia, and the United States. Hickory pick, sledge, and hammer handles and ash hay fork and rake handles are imported chiefly from the United States. Canada could produce the latter class at least. Such

Canadian handles as do enter the British market give every satisfaction.

Other articles required in Great Britain are plugs for paper mills, rolling pins, spring clothes clips, towel rollers, parts for toys, such as balls, wheels, reels, and picture blocks, tea trays, ladders, coat hangers, knife trays, and box boards. Samples of all the foregoing can readily be secured by the Canadian trade commissioners.

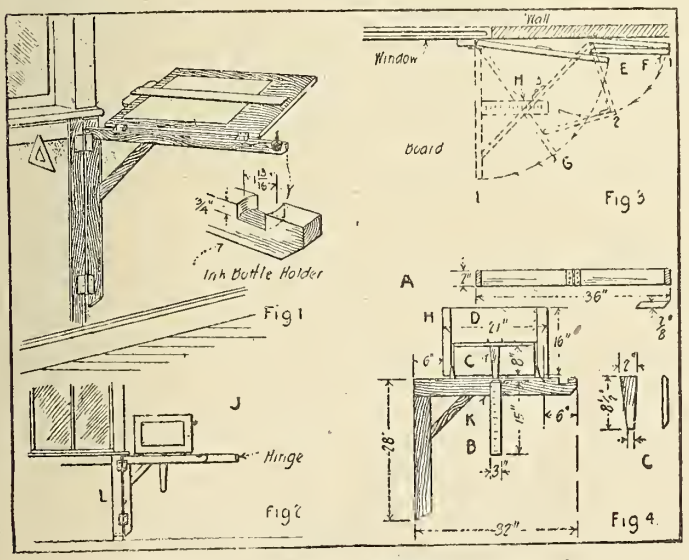
The government and the manufacturers of Canada have given much thought to this subject of small wooden goods, and it will require still much more. It is full of possibilities for our own people, who will adapt themselves readily to this work and find the material at hand.

Folding Drawing Board Holder

To have a drafting outfit in the workshop, where space and light are usually very limited, brings one face to face with two difficulties: One is to locate the drawing board, when in use, in a position to obtain the proper light, and the other is to get the board out of the way when not in use. In an effort to easily and cheaply overcome these difficulties, T. H. Linthicum tells in Everyday Engineering, fix up the rough though efficient arrangement shown.

The drawing board H is hinged to a bracket K, Fig. 4. The bracket is hinged to the side rail L, Fig. 2—under the window sill about 6 inches from the end. When the board is in use the bracket is held at right angles to the wall by a folding arm which is broken and hinged in two equal lengths— see detail A, Fig. 4. This arm also forms a rest for the adjusting base B, Fig. 4, which has one end hinged to the bracket. The adjusting strut C, Fig. 4, is hinged to a strip on the back of the board. Above the strut a pocket D is made of heavy cardboard for the drawing instruments. On the upper edge, near the end of the bracket, a 1 13/16-inch hole is made to hold the ink bottle—see detail Fig. 1.

The plan view, Fig. 3, shows how the arrangement works. E shows position of the bracket when folded against the wall, F the folding arm. Now when the board is needed, the bracket is swung out to position G; the adjusting base B raised; the strut on back of board set in a notch and then the bracket is swung into position I, and the adjusting attachment let down upon the arm. When not in use, the board is fastened back against the wall by the hook I, Fig. 2.



Convenient arrangement for holding drawing board.

The following materials are required for the holder:

One 1¼ in. x 2 in. x 29 in. side rail.
One 1¼ in. x 2 in. x 28 in. bracket upright.
One 1¼ in. x 2 in. x 32 in. bracket top rail.
One 1¼ in. x 2 in. x 18 in. bracket support.
Two ⅞ in. x 2 in. x 18 in. folding brace arms.
One ⅞ in. x 3 in. x 15 in. adjusting strut base.
One ⅞ in. x 2 in. x 8½ in. adjusting strut.
One pair 2 in. steel butt hinges for bracket.
Three 2 in. butt hinges for brace arm.
One 2 in. steel butt hinge for adjusting strut.
One 2 in. steel butt hinge for adjusting base.
One pair 3 in. "T" hinges for drawing board.

Frame up the bracket with mortise and tenon joints and hinge it to the side rail; then hinge one end of the arm to the top rail of bracket 6 inches from end, sawing the bracket at right angles to the wall, and hinge the other end of the arm to the wall. Prepare the drawing board and attach it to the bracket with the strap part of the hinges on the board cleats, and the butts on the top edge of rail. Then hinge the adjusting base to the rail so that the strut engages the notches.—The National Builder.

Furniture Factory at Windsor, N. S.

The plant of the Windsor Furniture Company, Ltd., which is located at Windsor, N.S., specializes in bedroom and dining-room furniture of the cheap and medium grades and employs from 75 to 80 men. This concern was first established in 1871 as a private undertaking. Later, in 1891, the company was incorporated. The plant was burned down in October, 1897, and rebuilt, and the company reorganized in 1898.

The company first began business as chair manufacturers and afterwards extended to rattan goods. After their fire they discontinued these lines and took up their present line. The main factory building is 193 ft. x 66 ft. and two storeys. Besides this there are several annexes. The finishing building, which is 2½ storeys, is 71 ft. x 41 ft. The warehouse and shipping room is also 2½ storeys and is 112 ft. x 45 ft. Another annex is 64 ft. x 26 ft. and three storeys high. Besides these there are four modern dry kilns, three of which are of the Grand Rapids Veneer Works type, and four smaller storage buildings.

The lumber used by the Windsor Furniture Company consists principally of birch, maple, oak, ash, poplar, pine, and spruce, by far the greater part of which is purchased in Nova Scotia. The company advise us that Windsor is one of the largest lumber shipping ports in Nova Scotia, and is very well located for obtaining supplies of this material by rail, water, or team. They also state that Windsor is the most central town in Nova Scotia, and is close to Halifax, the largest local market and port of call for all important steamship lines. The town has direct water communication with St. John, N.B., Boston, New York, and other ports.

The principal markets for the Windsor Furniture Company's product, as stated by them, are the Maritime Provinces, Western Canada, Toronto and Montreal, Newfoundland, West Indies, Bermuda, British Bahamas, British Guiana, and South Africa. The president of the company is Mr. A. P. Shand, and Mr. F. A. Shand is the secretary and manager.

Working Up Lumber in Humid Atmosphere

Author Thinks There Should Be Scientific Method of Determining Correct Percentage of Moisture Wood Should Contain

By W. Alexander

The fallacy that lumber cannot be too dry has prevailed for a long time among woodworkers. This may have been true in days gone by when all lumber was air-seasoned for years and then dried by placing the boards against the wall at the back of the stove. With modern dry kilns, however, it has been proved that lumber can be too dry just the same as it can contain too much moisture.

Too often manufacturers blame their dry kiln and condemn a certain make of kiln because they obtain unsatisfactory results in their drying. The fault very often is to be found in their own lack of knowledge as to how much moisture the lumber should contain for the particular purpose it is to be used. If lumber is too moist it will shrink and come apart or pull the work out of shape. If too dry it will swell and burst apart or warp out of shape.

Lumber should be worked at the natural humidity of the atmosphere as nearly as possible. This, of course, is more practicable in extremely dry weather than in wet weather. It is hard to get the workmen who have charge of operations in the mill to take the necessary special care to meet the changing conditions of the weather. Humidity changes do not come with every few days of rain or sunshine, but a long wet spell or a long dry spell will make a difference between swelling and shrinking of the same lumber.

In Ontario some manufacturers have found it advisable to use a different moisture content for their lumber in the winter and summer. This applies particularly to furniture which may be manufactured in Eastern Canada and shipped to the Western provinces. The difference in the humidity in the atmosphere in the Eastern and Western provinces is very marked in the winter, although it is not particularly noticeable in summer. The atmosphere is much dryer in the West in winter than in the East. Manufacturers do well to take these points into consideration in deciding on the moisture content of their lumber.

There are other points also which it is well to consider. One of these came to the writer's attention some time ago. An Eastern piano manufacturer shipped a player-piano to a dealer in Saskatchewan, the piano being boxed and the box lined with an extra heavy builder's paper. Besides this, an extra heavy paper cover was securely bound around the piano with tape. After being on the road for some weeks the piano, for some reason or other, was returned. When it was unpacked and the sliding panel in the top door pushed back, the glass which slides back and forth in front of the music-roll box was thick with frost like a window on a particularly cold morning. Further examination showed the tuning pins and strings to be in the same condition. When the piano had remained in the heat of the factory for a short time the moisture was running down the inside of it.

"On the other hand, the lumber dealer of the new school sells flooring by he hundred feet, or, better still,

Our friends from the West tell us that one does not feel the cold in that part of the country. It seems to us something like the fellow who falls about 5,000 feet from an aeroplane; he doesn't notice the distance he drops. However, the same conditions that affected that piano would have some bearing on a carload of furniture. Dressers, buffets, china cabinets, with glass and metal trimmings would not likely be as well protected as the piano. When transferred from the car to the dealer's floor and subjected to heat, something would be liable to happen.

The planing mill is not usually up against such varied conditions. The bulk of their product is used locally. Yet in the matter of interior trim and panelling for the interiors of residences, office buildings, etc., this subject holds considerable interest for them also.

Some firms have experimented along this line by placing test pieces of wood around the mill in order to ascertain the average existing percentage of humidity. It will be perfectly evident that it is useless to dry lumber and bring it out of the kiln with 5 per cent. moisture and take it into a mill where the atmosphere contains 7 per cent. humidity to work it up for cabinet work. For certain classes of work a little swelling and shrinking does not matter much, but then lumber works better when it is dry and is easier on machine knives. This is particularly true of birch. Most mouldermen know that birch with only 5 per cent. moisture will work 50 per cent. better than when it contains 7 or 8 per cent.

It seems to the writer that there is probably a field here for the dry-kiln manufacturers to do some work which would eventually be to their own advantage. These manufacturers have already achieved wonders in the drying of lumber, but if they could extend their investigations to a consideration of the effect of atmospheric humidity on woodwork they would be accomplishing something worth while for woodworkers. For instance, humidity charts showing the percentage of moisture best adapted for certain sections of the country at the different seasons of the year could probably be worked out. Government data from the various meteorological offices might be of assistance. I believe this matter is worth attention, and would like to hear the opinions of other readers of the "Canadian Woodworker."

How Boxes Should Be Made

The following specifications, which have been laid down by the Ordnance Department of the United States Government for packing boxes for equipment other than ammunition, will no doubt be of interest to box-makers:

Boxes must be made in a neat and workmanlike manner.

Two styles of boxes will be used: Style A having two cleats on each end, these cleats being vertical—that is, at right angles to grain of ends; Style B having four cleats on each end.

Style A will be used when the weight of contents is 100 pounds or less, or whenever the depth of box is less than 12 inches. Style B will be used when the weight of contents exceeds 100 pounds or the depth of box is 12 inches or more.

Lumber entering into boxes must be sound—free from decay and dote—and well seasoned. (An average moisture content of 12 to 18 per cent., based on

the weight of the wood after oven-drying.) Lumber must be free from knot holes, loose or rotten knots. Knots whose dimensions measured between and perpendicular to lines touching edges of knot and parallel to the edges of the board exceeds one-third the width of the board will not be permitted. No knot whose dimension measured in this manner exceeds three inches will be permitted. Knots which interfere with the proper nailing of the box will not be permitted.

The principal woods used in boxes are, for the purpose of these specifications, classed in four groups:

Group 1.—White pine, Norway pine, aspen, spruce, Western yellow pine, cottonwood, yellow poplar, balsam fir, chestnut, sugar pine, basswood, cypress, willow, noble fir, magnolia, white fir, buckeye, cedar, redwood, butternut, cucumber, alpine fir, and lodgepole pine.

Group 2.—Southern yellow pine, hemlock, Virginia and Carolina pine, Douglas fir, larch.

Group 3.—White elm, red gum, sycamore, pumpkin ash, black ash, black gum, tupelo, maple, soft or silver.

Group 4.—Hard maple, beech, oak, hackberry, birch, rock elm, and white ash.

When Groups 1 and 2 woods are used the thickness will be ¾ inch; when Groups 3 and 4 woods are used the thickness will be ⅝ inch.

Widths of Lumber

(A) No piece of less than 2½ inch face width shall be used in sides, top, bottom, or ends. (B) Not more than one piece less than 5 inch in width shall be used in any one side, top, bottom, or ends, except where side, top, bottom, or end is so narrow that this, together with "A" above, would necessitate the use of a single piece (See exception to this in paragraph below regarding joints.)

The purchasing officer will in each case specify whether box boards will be S1S or S2S*. When S1S, the surfaced side will be the outside.

*S2S should be specified when contents are such as to be damaged by abrasion on rough boards.

Considerable economy will result from allowing ⅝-inch material to be S1S since two thicknesses can be cut from nominal 1½-inch lumber, while ⅝-inch S2S sometimes requires 1-inch lumber for one thickness. Little, if any, economy will result from allowing ¾-inch material to be S1S.

All joints between boards shall be tongued and grooved or Lindermann jointed. When tongued and grooved, must be tight matched. When Lindermann jointed the specification requiring not more than one piece less than 5 inches in width in a single side, top, or bottom (see paragraph above) shall not apply.

Boxes having sides, top, bottom, and ends of Group 1 or 2 woods may have cleats of any of the species listed. Groups 3 and 4 woods are recommended for cleats. Boxes having sides, top, bottom, and ends of Groups 3 and 4 woods shall have cleats of woods of the same group.

Cleats shall be 2 inches wide and of the same thickness as sides, tops, and bottoms.

Nailing

(A) Cleats to ends: Cleats will be securely nailed to ends with nails sufficiently long to pass through both thicknesses of lumber and clinch. At least two nails will connect each piece of end to each cleat. Nails will be placed as near the end of cleats as possible without splitting cleats. Intermediate nails will be spaced approximately 2 inches along the length of the cleat. These nails will be staggered.

(B) Sides, top, and bottom to ends: Nails used will be cement coated. Proper size of nails depends on species and thickness of lumber receiving points of nails. The following schedule shall apply:

Schedule of Sizes of Nails

Classification of woods.	Thickness of pieces receiving points of nails.	Penny designation of nail.	Length of nails to be not less than	Average diameter of heads to be not less than.
Groups 1 and 2..	¾-in.	8d	2 5/16	9/32
Groups 3 and 4..	¾-in.	6d	1 13/16	¼
Groups 3 and 4..	⅝-in.	6d	1 13/16	¼

Nails may be as slender as can be driven without bending or breaking, but must conform to the above schedules as to length. The head of the nail must be heavy enough not to be readily broken.

Spacing.—Nails connecting sides, tops, and bottoms to ends will be spaced as uniformly as possible. Spaces shall average not to exceed 2 inches. On edges where cleats are used, approximately 50 per cent. of the nails will be driven into cleats. Top and bottom nails of sides will be driven into cleats. Each piece of sides, top, and bottom shall have not less than two nails at each end.

(C) Top and bottom to sides: Sizes of nails will be in accordance with above schedules. Nails will be spaced at approximately 8-inch centres. In all cases care must be taken not to overdrive nails. Nails should be driven so that heads are just flush with the surface of the lumber. No nails shall be driven into joints.

When box boards are Lindermann jointed, the requirement for two nails in each end of each side, top, bottom, and end board shall not apply.

Seal holes will be placed as provided in the drawings. When tops and bottoms are Lindermann jointed they will be considered as one piece and two seals only (one at each side) will be used.

Screws in seal holes will be 1¾ inch x No. 10 for Groups 1 and 2 woods, and 1½-inch x No. 8 for Groups 3 and 4 woods. Screws must not be driven by hammer.

Interior dimensions of boxes will be specified by the purchasing officer.

Not So Expensive After All

"Buy a nice hardwood floor for your kitchen — $6.76, nails and all included."

This idea, suggested by R. H. Isherwood, of the retailers' service department of the National Lumber Manufacturers' Association, when carried into effect by retailers, is proving a success, according to word received at the association's headquarters in Chicago.

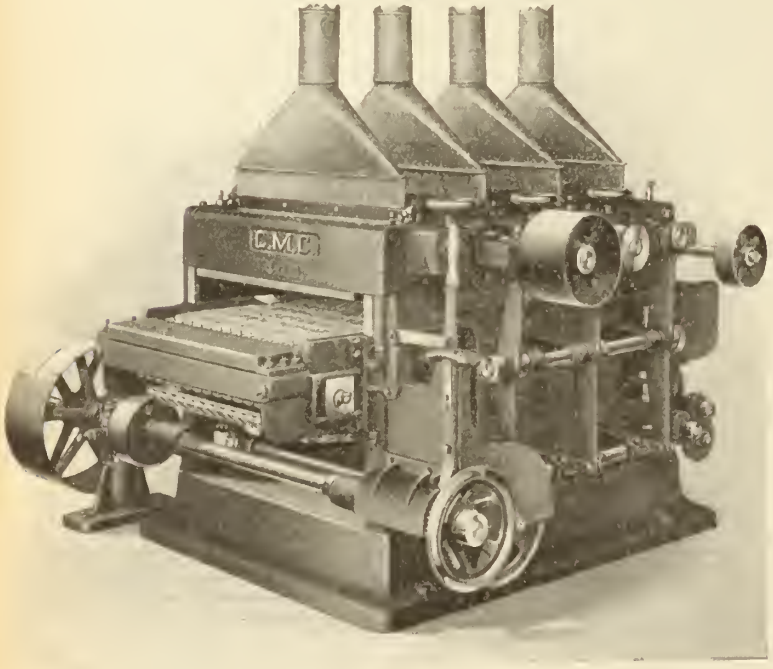
"When the average prospective purchaser walks into the office of a lumberman of the old school, asks the price of maple flooring and is told $40 to $60 he knows as much as he did before. He goes away with a feeling that his hardwood floor is going to cost a lot of money and perhaps he had better not get it. He does not know that the price given him was for a thousand feet," said Mr. Isherwood.

"On the other hand, the lumber dealer of the new school sells flooring by the hundred feet, or, better still, by the floor. Thus the average kitchen is 10 by 12 and would require 160 feet. This at $40 a thousand would be $6.40, leaving 36 cents for nails."

Revolving Bed Sander

The accompanying illustration shows the Canada Machinery Corporation's No. 400 Revolving Bed Sander. This machine is designed to produce high-grade work for furniture, piano, fixture, and sash and door factories where a high finish to the product is desired. The design and construction of the machine embody improved and patented features which make the machine an efficient one. The design is simple and no delicate or complicated mechanisms are used. This ensures a minimum of trouble and cost in operation. The illustration shows the construction of the machine.

It is built in three widths—30 in., 42 in., and 48 in. —each of which will work stock to a thickness of 5½ in. The endless bed consists of a number of steel lags or slats connected together by patented self-oiling links and pins. The slats travel on planed ways, which are provided with a special lubricating brush arrangement to ensure ease of operation and durability. Rubber pads are attached to the face of the slats. The bed is raised and lowered by power or hand, a stop being provided to prevent the bed running into the polishing drums. The bed is carried on large steel screws, the



The No. 400 Revolving Bed Sander.

screws being operated on ball bearings. Accurate adjustments at each corner are possible with this machine.

The pads on the revolving bed are of oval shape. They are made to give a good feeding hold; the greater the pressure the harder they grip. They are held to the slats by a steel cup washer and two steel screws. The company state that this arrangement eliminates the danger of the pads being torn off. The pads are placed diagonally on the slats and overlap one another at the edges. They thus present an unbroken surface. Enough elasticity is provided in the pads to allow slightly varying thicknesses of stock to be fed into the machine. The bed can be filled with narrow or short pieces, which can be carried through to uniform thickness. Pads are clean and kept free from dust by a patented arrangement of a revolving brush.

The drums are of the spiral wound type. The makers of the machine state that the successful operation of any machine of this type depends on the design and the care taken in the construction of the drums, and they confidently state that the drums they offer in this machine are constructed of the best material, by skilled workmen, equipped with special tools to ensure absolute accuracy. Special care is taken to see that the drums are accurately balanced. Twenty-four inch paper is used on all widths of machines.

Can Find Material Now

One day when I was in an architect's office we had occasion to find an example of the use of a sun-dial. He turned to a long box near at hand containing sheets of heavy paper filed vertically and drew out pages on which were pasted cuts, photographs, articles, and a reference list of garden ornaments. Of course, we soon found the details and information we sought.

His action solved for me the use of my large accumulation of clippings bearing on my own work—building materials. These had been kept in large envelopes, but were always being mislaid or destroyed, and required much thumbing when I was in search of an idea. I bought a large size transfer case with vertical filing sheets of heavy manila paper, and a set of guides. In my spare time I sorted the clippings, pasted them on the sheets, and filed them for convenient reference. The file stands in the drafting room, labelled "Ideas—use them." It has proved a great convenience to my designer and to my customers.

Each month when I have read my magazines I remove the advertising pages and clip and file all the cuts and ideas that are of value to me. With trade papers that come to the office I do the same; and once a month I take a convenient hour and look over half a dozen trade, technical, and art magazines in a book store that carries a large line of these publications. Then I buy any number that contains something I want. This saves me an expensive list of magazine subscriptions, while often one article, illustration, or advertising cut is worth to me the price of the issue containing it.—J. B. Brown, in System.

Utilizing Crating

The Singer Sewing Machine Company, which is one of the biggest users of veneer and built-up work in the country, has been setting a good example in the utilization of crating. The writer passed one of the branch agencies of the company recently and found big piles of machine crates bundled together pretty much as window sash is crated up in bundles, and upon enquiry was informed that it was the crating from a shipment of machines which was itself being crated up and returned for re-use.

This is an effective saving in wood which furnishes an idea that may well be taken up by others, modified to fit their needs and put into service. The crating item, even in the veneer and panel industry, is one of considerable importance, and any plans for increasing the value of crating at destination by re-use merit attention.—Veneers.

Good painting cannot be done in a hurry. No matter how much brains are used in the mixing, or how much elbow-grease in the application, if necessary time is not given for the paint to dry thoroughly the proper results are not obtained.

"Safety First" Department

Safety Work in Woodworking Industries*

By J. J. Heelan

Every effort in the interest of safety is worthy of praise, and too much cannot be said for those members of the woodworking industry who have performed such excellent work along these lines. I do believe, however, that the majority of firms in this industry have spent a vast amount of money for this purpose without obtaining what might be considered satisfactory results.

By reason of the nature of the machinery used in this industry, efforts devoted towards accident prevention are concentrated largely on guards for the various moving parts of machines, including the point of operation or place where the feeding is done. Considering the different types of machines and the variety of work to be performed, there are many difficult problems encountered, which situation is familiar to all of us when we realize how little success we have had so far in finding a universal saw-guard. I believe this difficulty to be the main reason for failure, in many instances, to carry out progressive safety work.

Frequent Repairs Necessary

Woodworking machinery must necessarily run at high speed, which calls for frequent repairs and adjustments. This has been found to be the cause for finding many machines running without the guards being replaced. In an effort to learn why such conditions exist I have been given some varied demonstrations of "passing the buck," indicating the need for an efficient safety system in the plant.

The opinion generally prevails that because a guard cannot be used for every piece of work it cannot be used at all. Money spent for guards found hanging on the walls may have been intended for artistic decorations, but I believe better results could be obtained in other ways.

A very general explanation for failure to find a guard on the machine is that the workman will not use it. To my best knowledge no workman has yet refused to accept compensation when injured because he worked without the guard when its use would have prevented the accident.

Feeding a machine is generally a safe occupation if the operator knows his business and will keep his mind on his work. When an accident occurs to a machine operator we often find that he knew how to do the work of feeding, but was not thoroughly familiar with the things he should not do in order to avoid being injured—such as cleaning up around machine while running; removing, with his finger, the small piece from the rear of saw; running a short piece over jointer, or some similar operation.

The old-time machine operator receives a serious injury occasionally through failure to give constant attention to his work. This points out the necessity for the use of guards wherever practical, and particularly a well-organized safety system to carry on educational work.

Considerable credit is due manufacturers of woodworking machinery for the progress they have made along the lines of safety. Modern types of machines are turned out in which many of the moving parts, formerly found exposed, are now completely enclosed. The cylinder head for the jointer is a wonderful invention when we consider the serious accidents it has prevented. Once in a while we run across someone who is still laboring under the opinion that the cylinder head will not do satisfactory work, but I am glad to say that such occasions are now very rare.

Home-made Guards

The numerous home-made guards and appliances found in the plants of the woodworking industry demonstrate that the means for preventing accidents are no less than with other industries in which certain difficult problems also exist and which have not as yet been entirely solved, but this does not preclude carrying on progressive safety work.

I have noticed, particularly in the woodworking industry, the hesitancy on the part of the employer to exact discipline from his employees in respect to safe methods for doing work, and I do not understand why this should be more noticeable in this industry than in others. If the number of men experienced in this line of work was very limited we might claim this to be the reason, but I do not believe that such is the case. The old-time woodworker is pretty well set in his views, and has cultivated a sort of dignity which causes him to act resentful whenever a suggestion is made as to a change in the method of doing his work. I have been in plants where this difficulty has been overcome, and a very low accident record has been the result.

While we fully realize the humanitarian duty to prevent the consequences of injury to workmen, there is a great demand for the performance of this duty at the present time. The man in the factory is needed by the government just as much as the one who digs trenches and fights at the front. The difficulty in obtaining help is quite obvious, and the elimination of one man from his duty at this particular time as the result of an accident is evidence of a serious error.

Constant Battle of Education

In reviewing the difficulties of the woodworking industry with the problem of accident prevention, it appears that discouragement has interfered with progress, and in some instances has caused a plant to revert back to the old condition, where little effort was made to avoid accidents. The time has now arrived when every firm in this country must take up safety work in earnest, and this means the immediate adoption of an efficient and energetic safety system in every plant if it is to continue in operation. Constant attention to education along the lines of safety is the most important part of this system, and by reason of the present situation in the industry I believe this feature alone should produce some wonderful results.

Our greatest danger lies in the neglect of duty, not its performance.

* Paper read at the annual meeting of the National Safety Council, Hotel Astor, New York, September 10-14. Mr. Heelan is supervising inspector, Liability Department, Aetna Life Insurance Company, Chicago, Ill.

Upholstering and Trimming

Standard Frames for Upholstered Chairs

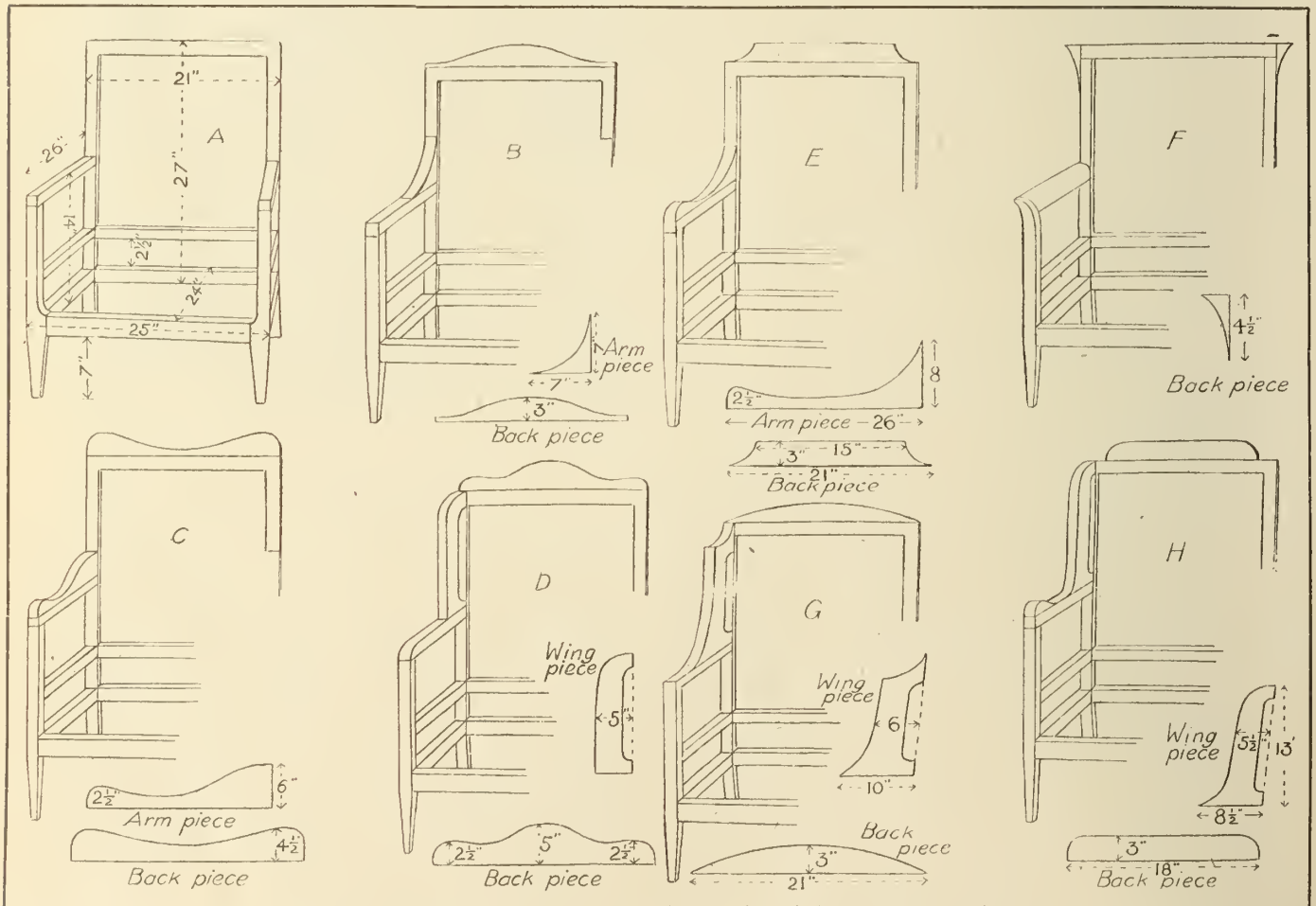
The seven chair frames illustrated here are variations of the square chair frame sketched at A, formed by fixing pieces of wood of different shapes to the arms and back. The principle of standardization is applied; the square chair frames may be made in quantities, and, at the same time, by the addition of the shaped pieces, the outline of the chair may be altered as desired. A range of chairs may thus be offered by the retailer, so that the public may exercise its faculty of selection. The ability to offer a diversity of patterns is a real advantage, for, other things being equal, the public will patronize the shop at which the greatest number of designs may be seen.

From the point of view of the works manager, the advantage of standardization need not be insisted on. It enables him to arrange long "runs" instead of short ones, and at the same time to produce several different patterns at about the same price. The traveller who has two or more customers in the same town is enabled to reserve some of the designs to one furnisher and the remainder to another in the same neighborhood, and the tendency to price-cutting by competitors in the retail trade is thus sensibly diminished.

Frames such as those illustrated are generally used for an inexpensive class of upholstering with a minimum of stuffing; the wood line of the arms and back is the finished cord line.

The principal dimensions are given at A, and, in the absence of a complete cutting order, the following sizes may also be useful to those not fully conversant with frame-making: The base frame should be made of 2 in. by 1½ in. birch; the back uprights 1½ in. by 2 in.; and the fronts and arms 1 in. on the face by 2 in. The thickness of the shaped loose pieces is governed by the parts to which they are applied.

The examples B, C, E, and F—the shaped pieces—should be fixed to backs and arms by glueing and nailing. The wing-pieces in D, G, and H should be dowelled or screwed from the back. As regards example F, two pieces only are needed for the back; the shape of the arms is obtained by the use of the spokeshave on the square interior edges until the required section



A number of designs can be produced by attaching bandsawed pieces to a standard frame.

is produced, the line of the upholstery being carried out in the same proportion. This example is interesting as showing how radically the character of a frame may be altered by very simple means. A, F, and G are so dissimilar in outline in their finished state that the customer would scarcely believe, even if he were told, that he is choosing between frames which in all essential respects are exactly the same.

The principle of standardization has been applied more generally to carcase goods than to chair-frame making but we think readers will agree, with the examples we publish before them, that there is a great deal to be said for its adoption.

It certainly facilitates rapid and economical production, and the objection that it makes for dullness and uniformity, or tends to a limitation of the number of available patterns, may be successfully met by the exercise of a little ingenuity on the part of the frame-maker.—The Cabinet Maker.

Chair Chat

The other night several furniture men were dining together at the Congress Hotel, Chicago. The conversation turned to the matter of co-operation between the furniture manufacturer and the retailer. One of the men, who is a successful retailer of many years' experience, made the following statement: "In years past I used to consider that my ability to make money laid along lines of shrewd buying, whereby I was able to meet my retail competitor, because I could buy the goods for less money than he could. For a time that was all right, but as business with the factories with whom I dealt improved, I noted that my troubles and worries increased because my orders were not shipped by the factories as promptly as I desired and I was constantly writing letters, telegraphing and telephoning to the manufacturers, and eventually decided that I was losing business because I did not have the goods when I wanted them. Gradually my policy changed, and today, instead of buying from Tom, Dick and Harry on the price feature only, I have settled into certain channels for supplying my wants with certain kinds of goods. The result is, I am probably paying a premium to those factories from whom I buy, but I note that my profits are steadily increasing and that my turnover of stock is accomplished with greater ease and considerably less mental annoyance to me. After cementing relations with my manufacturer for a few seasons I have a better insight into their problems, and am the more willing to give and take on many matters which formerly I was inclined to split hairs about, and naturally that oftentimes created friction, which was bad for me as well as for the manufacturer."

That statement of the retailer has been in my thoughts much since that night, and I believe the broad gauge manufacturer and retailer realize the growing necessity for service required by the retailer and which must be supplied by the manufacturer. Take, for example, the application of scientific methods in the finishing department of furniture factories whereby the process which formerly was of many weeks' duration in passing goods through that department has been curtailed to a minimum, and which is a big advantage to both the maker and the buyer.

The tendency of the dealer to carry as small an investment in stock on hand as possible (especially in chairs) causes him to lean more and more on the factory and to depend on the factory for ability to fill his requirements with all speed possible. The factory, on the other hand, is desirous of having its active patterns as few in number as possible, and it works an immense hardship where the dealer makes demand of quick shipment on a pattern which is not carried finished by the manufacturer.

How is the manufacturer best going to know what designs of the total number in his line to make ahead in quantities available for the wants of the retailer throughout a season? This question has always been with us and undoubtedly always will be. However, manufacturers are entitled to all the foreknowledge possible, and there seems to be definite agitation along a certain line which will materially aid in answering that question.

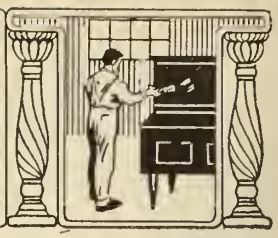
The several associations of manufacturers of furniture are now considering a proposition to change the market months from January and July to May and November. The purpose is obvious in that the month of May is a better season of the year for the retailer to travel to the markets than in January, and as most business firms, both manufacturing and retailing close their fiscal periods the last of December, there is much demand upon the executive aside from the preparation and inspection of the lines for the markets. Aside from those considerations, the fact is that inspections of the exhibits in May by the buyer will permit of orders being placed at that time which can be executed by the factory in ample time for delivery in July for the August sales, which are a fixed institution in the retail furniture trade. The same situation applies to November, affording opportunity for shipment in January for February sales. It seems that this question does not affect buyers of the larger cities, who make frequent trips to the market centers at any time of year, but the rank and file of the buyers throughout the country can, in the months of May and November give expression to the manufacturers of their tastes covering the designs shown and the manufacturer is entitled to all the foreknowledge possible to direct his policies.

A speaker at a meeting of manufacturers in New York City recently stated that it is a custom established for many years that the buyers of rugs, carpets, draperies and crockery inspect the samples prepared by the manufacturer and place their orders for delivery six months or a year later. Thus the manufacturer is working along definite lines, prices are stabilized, overproduction is avoided and the whole tendency of the industry is toward definite profit for all concerned.

The furniture dealer wants service. The manufacturer wants to give service and if by changing the months of the exhibit seasons from January and July to the months of May and November, greater efficiency can be obtained, then it should appear as a good fifty-fifty proposition to both the retailer and the manufacturer.—Furniture Manufacturer and Artisan.

C. E. Bosworth, United States commercial agent in Australia, in a recent report says: It is claimed by a person in Melbourne, that by a newly discovered process, even with the present crude equipment, sole leather can be tanned in seven days, sheepskins in one hour, ordinary hides in from one to six hours (according to weight), calfskins in six hours, and fur skins such as rabbit, etc., in three days.

THE FINISHING ROOM



The New Finish for Oak "Sequoyah"

By Walter K. Schmidt

Manufacturers have undoubtedly noticed the announcement of the new oak finish, "Sequoyah." The great amount of interest manifested regarding this new finish clearly shows that oak as a furniture wood is coming back. Why shouldn't it? It is an American wood, with an American name. For durability there is no better work, and no other wood has afforded the vast amount of different finishes. Therefore, the announcement of a new finish and the fact that its success is assured makes it all the more interesting. One might naturally ask, Why did they call it Sequoyah?

It had to have a name. Sequoyah was an Indian whose fame has been commemorated in various ways. Living in the United States, in Georgia, he later migrated to Oklahoma, and then, in his old age, returned to Georgia. He produced an alphabet so that the Cherokees could transmit thoughts and messages the same as a white man. It is a most interesting story, and any furniture manufacturer that cared to get up a bit of romantic advertising could well afford to look up the history of this man's life, and his advertisements would be read. Is it not most natural that in casting about for a name we select a purely American name, a name that is euphonous and one that is generally known throughout America?

What is the finish, and what does it look like? It is a difficult thing to describe. It must be seen to be appreciated. It is a transparent color, on a greenish-gray order, the gray predominating, the flakes giving the entire piece a watered silk appearance. Its production is absolutely different from the usual methods employed for finishing inasmuch as an oil surfacer is used before the stain. After the stain a lacquer is used, which is finely rubbed to a polish by a unique method of sanding in the wax.

Sequoyah oak as it is produced is not an experiment. Some six months of experimenting and finally submitting it to furniture factories has made the production of Sequoyah oak a fact. It is an interesting story relative to the inauguration of a new finish. Undoubtedly all furniture manufacturers are familiar with the immense amount of energy expended upon the standardization of the present-day finishes.

The campaign has been going on for a year, and is to be again revived, so that in the coming January sales more goods will be shown in standard finishes than ever before. Being mindful of the work required to re-establish standards, those interested in the production of a new oak finish seek to forestall any possibility of this finish coming out in anything but one way, and, with that end in view, every panel that is sent out has been censored and passed upon, and the instructions for the production so explicitly given that no variance in shade or style of finish is possible.

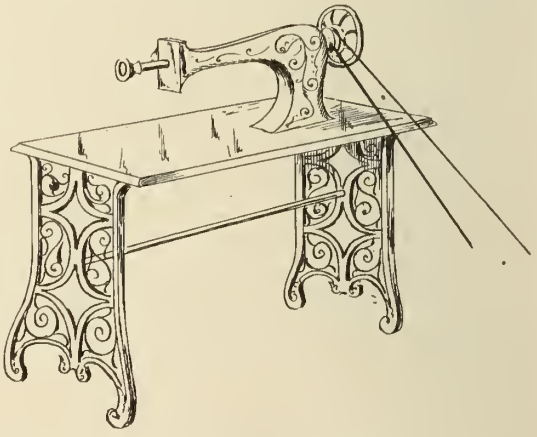
When one stops to think that articles have appeared in which they dwelt upon "the brown monotony of the American home," how refreshing is the announcement of a new color, absolutely at variance with anything that has heretofore been attempted. We have had our grays, such as silver, driftwood, etc., many of them produced by the use of a white filler, whereas this new finish Sequoyah is not filled at all.

There has been a demand for a new color, and the writer believes that the monotony of the finishes in which oak was offered has been the reason for its popularity decreasing. But with the advent of a new shade it is bound to return. One must consider the demands of the school authorities, who have learned that cherry or mahogany finishes are harmful to children's eyes. The demand of the modern apartment houses is for a finish that will rather tend to refresh light than to absorb it.

In congested buildings where space, especially ground space, is valuable and where light is not altogether plentiful, a cheerfulness is produced by a wood that gives rather than takes what little light there may be. Sequoyah oak is designed to aid the housewife, in that it will be easily maintained. A provision has been made for this in the way of reviving compound so that any marks or blemishes may be easily cared for, and a bit of it on the dusting cloth will continually maintain the original finish. The original finish of Sequoyah is such that abrasions do not affect the finish as in heavily varnished surfaces; but, on the other hand, the finish is such that a great amount of durability is anticipated, and the amount of care required far less than that of many finishes gone before.

Finishing Turned Knobs

How an old sewing machine was rigged up in a furniture factory to finish turned wooden knobs is shown in the accompanying sketch. A tapered spindle



Sewing machine as knob polisher.

something after the style of a reamer projects from the part of the machine which ordinarily contains the needle. The end of the spindle enters the screw hole

in the knob. The knob then revolves and is polished with oil and shellac. It can be rubbed down with pumice stone if desired.

The sewing machine, instead of being worked with the foot treadle, is operated by a belt from a pulley on the countershaft, which operates the graining machine. It is not necessary to stop or start the machine to put the knobs on or take them off. The boy that operates the machine can easily loosen them and take them off with his hand.

Tests for Finishing Materials*

There is no line of business with which the writer is familiar in which the materials used vary so much as in the painting and wood finishing business. The goods made by one manufacturer will frequently be worth more than the same materials turned out by another manufacturer. Not only this, the goods made by the same manufacturer will sometimes vary considerably with the various batches turned out.

When we remember this we can readily understand the desirability—yea, the absolute necessity—of the painter having some simple tests by which he can get at least an idea of the true quality of the material he is about to use. If he opens a barrel of linseed oil he ought to be able to know that the package contains just what it says it does and nothing else.

But someone will say: "I buy linseed in barrels, with the crusher's name and guarantee on it; hence I know I am getting pure oil." We all know the legitimate crusher's name and his guarantee are all right, and if the oil gets into the painter's hand without the bung being removed, after the crusher puts it there, then there is neither question nor trouble.

This does not always happen, however, for not many months since a broker or jobber in Chicago had to admit, under oath, that he drew two and one-half gallons of raw oil from each barrel and poured in two and one-half gallons of "dope," chiefly benzine, and simply changed the stencil to read "Boiled Linseed Oil" instead of "Raw Linseed Oil," leaving the manufacturer's name and guarantee intact.

The painter who bought five barrels of this oil accepted it in good faith, because of the manufacturer's name and guarantee, and spoiled a lot of work, which had to be done over again. If he had not put two much dependence in the statement on the barrels he would have saved himself a lot of trouble and expense, as well as an injury to his reputation.

The equipment required for testing most of the staple materials used by the painter is neither great nor very expensive. Indeed, the expense is so little that we often wonder why every shop does not own an outfit.

It is not the writer's intention to give directions for testing all the various materials the painter uses, for this would encroach too much upon the time of this convention. We must, therefore, content ourselves with the consideration of a few of the staples.

White Lead

This old, reliable painters' material is easy to test, provided it is strictly pure carbonate; but if it should happen to be sulphate or a composite base the task is more difficult. The eye will usually be all that is needed to determine whether the lead is white enough. For fineness we may put a very little of the paste on the nail of the thumb of one hand and spread it with the forefinger of the other hand. It will be easy to see whether the lead is fine or coarse.

We will now light our little alcohol lamp, which is similar to that used by jewellers, and, after scooping out a small place in a piece of charcoal and filling it with the white lead, we take a small blowpipe and direct the flame from our alcohol lamp upon the spot of white lead. If it is pure carbonate, it will soon be reduced to metallic blue lead, forming in the shape of small shot-like particles. If it is sulphate, instead of the carbonate, or if it is a combination lead, it cannot be reduced to blue lead without the addition of a flux.

If no blowpipe and charcoal are at hand, a match may be inserted in the white lead, being sure plenty of lead adheres to the match, and, holding this match in one hand, burn other matches under it, allowing the flame to play on the white lead. This heat will soon reduce the white lead to metallic blue lead, if the sample is carbonate. If it is found that the material is not carbonate, and a qualitative analysis is desired, we would advise the painter to consult a chemist.

To determine whether keg lead contains an excess of moisture or not, stick a piece of sheet gelatine down in the lead and let it remain there all day or all night. When removed, if the gelatine is soft, the lead is "long" on water; if the gelatine remains stiff and springy, there is no excess of moisture present. This is a good test to determine whther the lead is dry-ground or pulp-ground. Dry-ground lead will not soften the gelatine.

To test the capacity (or covering power) of white lead, weigh exactly four ounces of the lead in a cup. Now add two ounces more, by weight, of linseed oil; mix thoroughly and apply a coat to an ordinary school slate and note which of the samples covers the dark surface best.

Red lead may be tested the same as white lead. If either is in a dry state, rub to a paste on a piece of glass, using an elastic spatula for rubbing up.

Linseed Oil

In these days of high prices, the market is flooded with linseed oil substitutes and imitation oils. Since linseed oil is the very life-blood of paint, it is imperative that its purity should be above question. Since we know of no simple tests that can be absolutely relied upon, and since it costs so little to have a chemist tell us the real facts in regard to our oil, it would seem that if there is even a suspicion that our oil is not pure it would be worth while to send a sample to a chemist occasionally in order that we may be sure of our ground.

Take a few drops of oil in the palm of the hand; rub the hands together briskly, until quite warm. Smell the palms quickly before they have a chance to cool. If the oil is adulterated with resin oil, fish oil, or petroleum (the usual adulterants) the sense of smell will usually establish the fact. If the oil is raw, take half a teaspoonful in the mouth and taste it. If it is pure, the oil will have a pleasant, slightly bitter, nutty, seedy taste; but if it contains any of the usual adulterants and the sense of taste is normal, their presence will be made manifest. Because of the drying salts that are invariably added to boiled oil, this always has a very bitter taste.

The color and body of linseed oil enable one to tell whether a sample is raw or boiled. Raw oil is thinner, much lighter in color, and has a golden amber tinge.

* Paper by Chas. H. Webb, read before Illinois State Association of Master Painters.

Most boiled oil is quite dark and of a distinctly reddish color.

William E. Wall, of Somerville, Mass., the well-known and greatly-loved artist-grainer, tells us that he places great reliance upon the "bottle test" for linseed oil. He takes a clean, flat bottle, holding half a pint, and fills it with oil. He then inverts the bottle and allows the oil to run out quickly. The bubbles formed above the oil and left in the bottle will all be five-sided if the sample is pure linseed oil; but if it contains 3 per cent. of petroleum, or hydrocarbon oil, there will hardly even be any bubbles formed; and, if they do form, they will not be five-sided.

Japan

There are few materials used by the painter that cause so much trouble as japan. A little poor japan will often spoil a lot of good paint and put the painter up against a bunch of trouble.

A favorite method of testing, with the writer, is as follows: We secure a clear, round bottle, holding not less than four ounces. On this bottle we paste a piece of white paper, starting the paper even with the inside of the bottom. On this piece of paper we make a gauge to indicate twelve parts of raw linseed oil and one part of the japan to be tested. We first pour in our oil, getting exactly the quantity required, then add our japan. We shake the bottle, noting whether the japan curdles or not.

With a small brush we apply a coat of this mixture to a piece of glass, and stand it on one side. We note how long it takes to dry, and also the toughness, brilliancy, and smoothness of the film formed. We determine the toughness by running our penknife blade through the film, cutting it off in long ribbons if the film is tough.

We also mix a little white lead paint with our mixture of oil and japan, noting whether it curdles or livers the paint, and also how it dries. When the paint is thoroughly dry on the glass to which we applied it, we test the toughness of the film as above.

Test several japans in competition, and it will be easy to determine which is best, cheapest, and most economical in use.

Tinting Colors

In testing tinting colors we need a small pair of apothecaries' scales and suitable weights, a spatula, a piece of glass, suitable in size, some zinc oxide or white lead in oil, and a bottle filled with half raw oil, one-fourth good japan, and one-fourth turpentine.

Suppose we wish to test a number of samples of Prussian blue, yellow ochre, chrome green, or any other tinting color, to determine which is best and cheapest for the price. We weigh exactly an ounce of the white base we are using.

Without removing the white from the scales, we put a half-scruple weight on top of the ounce weight and put tinting color on the white until the scales balance perfectly. This gives us one part of color to forty-eight parts of white. We now remove all the paint from the scales and deposit it on the glass. With our spatula we mix the paint, reducing it somewhat with the liquid we mixed in our bottle.

Now we take a clean brush and, after adding a little mixing liquid from our bottle, we stir and work the mixture on the glass, adding the mixing liquid as needed, until the paint is of brush consistency. We now paint a small space on a piece of glass, using gummed labels to identify the samples. It is best to number all samples to be tested, and identify the painted samples by the same number. When dry, the depth and clearness of tint produced and the prices of the tinting colors will guide in deciding which sample is best for the price asked for it.

Varnishes

Only "Father Time" can determine to its certainty whether a varnish will be durable or not, but there are many things about a varnish that a finisher can and should know in advance, such as its working and drying properties, its brilliancy, and the toughness of the film formed. To test a varnish we will need only a piece of glass, some gummed labels, and a clean cup and brush for each sample. After numbering our samples, we flow a coat of each on a separate space on our glass, marking the space to correspond with the sample. We make a note of the working properties, drying, etc. When dry, we test the films for toughness, using a penknife, as stated above.

Everything else being equal, the tougher and more elastic the film formed the more durable the varnish will be.

Dry Colors

In testing dry colors we simply rub them up to a thin paste on a piéce of glass, using either water, to which a little gum arabic has been added, or the mixture of oil, japan, and turpentine used in making the tests of color in oil. All color samples should be painted on glass, and be observed through the glass, when determining their relative strength and richness.

Their fineness may be determined at the time of mixing, or may be judged from the painted side of the surface to which the colors are applied.

Offered Bonus for Good Work

How a manufacturer of refrigerators overcame the necessity of having an inspector pass on all refrigerators before they went to the shipping room was told some time ago in System. His workmen were above the average, and he spent a great deal of time in trying to impress upon them the importance of thorough workmanship. Nevertheless he found it necessary to employ an inspector to pass on all refrigerators before they were sent to the shipping department.

Since he believed that the expense of this inspector and the loss of time in sending refrigerators back to the shop for minor corrections was unnecessary, he finally hit upon the plan of offering a bonus to the workman who had the least number of demerits marked up against him for the month. This bonus system had almost eliminated carelessness in his factory.

Seaweed for Wiping Filler

Considerable activity is being applied at Prince Edward Island to the gathering of seaweed for commercial purposes. This material is used in fairly large quantities in furniture and piano factory finishing rooms instead of rags for wiping filler. A report states that the dried product sells for around $40 per ton. Companies have been formed to put the business on a commercial basis. A gasoline-driven motor mower, controlled from a motor boat, cuts the seaweed, which is then loaded into a scow and brought to the shore and dried in the sun.

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FRENCH LACQUER

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(1) Apply the stain.
(2) Give a thin coat of Shellac.
(3) Sand lightly.
(4) More Shellac.
(5) Sand again.
(6) Wax and Polish.

FRENCH LACQUER WAY

(1) Apply the stain.
(2) Thin coat of Shellac (or Kopalac).
(3) Sand lightly.
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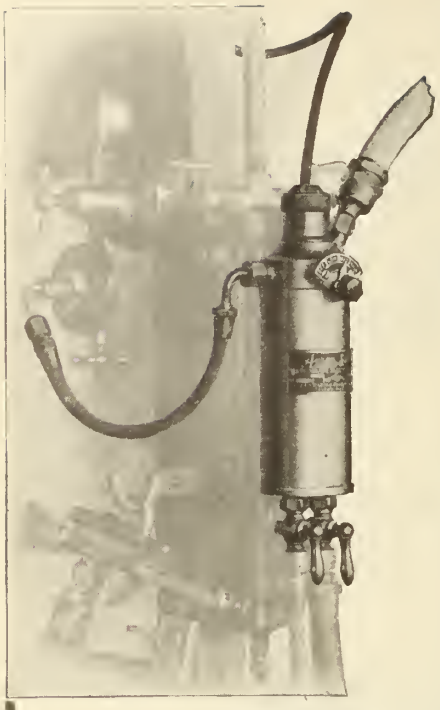

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Of the two types here shown, the E F Electric Heater at the left is for use with separate container Aerons only;—it is located at the nearest practical point to the spray nozzle;—both varnish and air pass through the heater and are properly heated for producing work free from pebbling and of highest quality;—it has a variable heat, 3-point switch to meet all working conditions;—it is operated from any lighting connection and consumes little current;—it is of rugged and dependable construction and is warranted against burning out.

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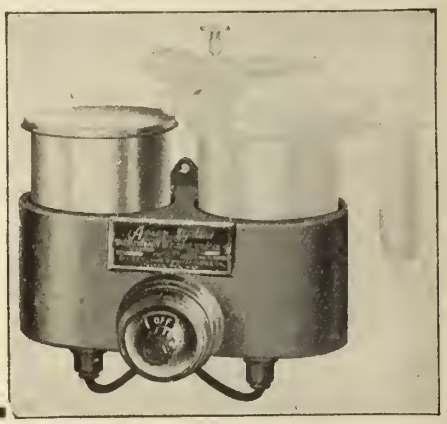

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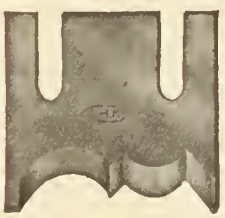

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Veneers and Panels

Sanding Machines and Their Many Uses

By Lewis Taylor

Of all the different kinds of machines that have revolutionized the woodworking industry none have played, or are playing, such an important part as sanding machines. In this article I am going to speak of some experiences with the various kinds of sanding machines.

One factory superintendent of the writer's acquaintance insisted that veneers be laid singly. The cross-band had to be thoroughly toothed before the face veneer was laid. This was all right, but it entailed a great deal of labor. It was, therefore, suggested that the cross-band be put through the three-drum sander, with coarse paper. This, on being tried, was found very satisfactory. It left a clean, even surface, with the necessary roughness needed for laying veneer to stay laid; not to peel off, as is often the case with veneer laid on a smooth surface. This is one instance of labor saving effected by the sander, and anyone who has had experience hand-toothing—say, piano tops or bottom doors of gumwood veneer—will know what I mean.

The belt sander is a great labor-saving machine, and, what is more, it is a satisfactory machine if it is handled properly. The secret of success with this machine is even pressure properly applied. To obtain this a block about as wide as the belt should be used and the stock operated so as to be travelling to and fro slowly. This will avoid undue pressure in any particular place. If this operation is properly attended to the stock will be finished smooth and even—as good, and even better, than by the best hand-cleaning process.

Some men have a special aptitude for this kind of work and become experts in the operation of these machines, both as regards speed and finish. Hollow and round work can be done just as satisfactorily as the flat work. The block used for this kind of work should be the same as for hand work—not to fit too snug to the hollow or round, as the case may be. In this operation the chief point to watch is not to sand through the veneer, which is very easily done if the operator is not careful. This can be avoided if the block used is made so as to bear more on the centre than on the outsides. This will lessen the danger of grinding the veneer off the sides of the hollows or rounds.

A great many factories are sanding their hollow and round stock by the belt sander, at a great saving on the expense bill. It has been mentioned in a former article in the "Canadian Woodworker" that the stock to be machine sanded should be thoroughly dried out before being subjected to the sanding operation. This point should be emphasized. The rotary cut veneer is very thin to start with, and will not stand the friction applied unless thoroughly dried out; and, even then, care should be exercised regarding the pressure applied. Some of the veneer troubles in the factories develop through this grinding process on green stock, owing to the heat generated by the friction.

The edge belt sander is a valuable machine for any woodworking factory, and will give a clean, straight edge without any skill being required to operate it. Take, for instance, stock that has been ripped and run over the jointer and then given to the man on the bench to clean up by hand. This takes considerable time, and it is certainly surprising how little time and what a good job the edge sander makes of it.

In sanding veneered edges care should be taken to apply the stock to the surface of the sandpaper belt even, as too much pressure at one end will certainly grind the veneer off; but this will never happen if the operator is at all awake to his job. Another good feature of the edge sander is that it sands with the grain of the wood, leaving no lateral scratches as the old drum sander would do.

I noticed an advertisement on the back cover of the October issue of the "Canadian Woodworker" of what appears to be a first-class sanding machine. I have never used one of that particular type, but there is no doubt that good work could be done on it.

In the plant where the writer is employed there is a sander with an oscillating disk which is very satisfactory, but for good work the paper must be renewed often. Of course, the heavy belt paper will last a great deal longer. With this machine considerable care has to be exercised to avoid sanding the stock out of shape. The trouble with some men on this work is that they are too careless and will not put on the proper sized disk. They try to make a larger size do, and the result is that they grind the curves out of their original shape altogether. With steady pressure and proper care good results can be obtained.

The writer has come to the conclusion that there is hardly any limit to the uses to which sanding machines can be put. They are, of course, like any other machine; a little judgment must be used, and if the machines are given a proper chance they will come up to all requirements and will help to cut the factory costs considerably.

Protect the Veneer Stock

Owing to the rapid decrease in the supply of all kinds of wood suitable for manufacturing purposes, we will soon, because of this condition, be forced to adopt on a much larger scale the use of veneered stock, says L. M. Wilson in Veneers. Therefore, we will have to guard well the present supply of woods suitable for the faces or exposed parts used for various purposes in woodworking factories.

In the face of these facts are we going to run hog-wild in handling our sawed and rotary-cut veneer by paying no attention to wastage, or are we going to pro-

fit by our past experience with the solid woods and be more careful in working the veneers we have to purchase or cut in our own plants?

Having studied the situation thoroughly, the writer is of the opinion that there are four separate stages in the manufacturing of veneer stock which must be closely watched if we can expect to effect a saving: Using judgment in the buying of the right kind of stock for the work; improper care and storage of stock when delivered to the factory; allowing too much in over-size cutting on faces and centre cores before laying; loss sustained by rough handling and poor sanding when veneered stock has been delivered to machine room.

The reader will observe that in this instance we have placed improper buying at the head of the list, instead of dumping more abuse on the manufacturing end. There are several points one should observe in purchasing veneers, but lack of space will not allow us to treat all of them, but one of the principal points to be observed is in seeing that you get the grade ordered.

Suppose one should order 10,000 feet of firsts and seconds,, 1/20 in., quartered-oak veneer. Upon invoicing, the firm you placed your order with find that they have approximately 7,000 feet on hand. One can readily see what they are forced to do, namely, select or cull the remaining 3,000 feet from some lower grade; and, unless one thoroughly understands the game, they will get by with it. Of course, all firms will not resort to this trick, but we never know, so we would advise a close inspection of all veneers purchased, and if you are not familiar with the different veneer grades it's time to get busy and be from Missouri.

Another point to be closely observed in purchasing quartered oak is that of the coarse or open-grained stock. While the figure in this species is usually very pronounced, yet the writer has known of several instances where, when the stock was removed from the retaining clamps, about one-half of it was found to be spliced together as though one had intended the gluing up of a solid piece. When pried apart, the veneer is so badly torn the stock must be cleaned off and relaid or thrown away. Another good point to observe is that of sizes, especially in sawed quartered oak. Suppose one was in need of some sawed veneer, say 8 in. long, free from defects. Your first thought would be: "Guess I had better order 10-in. stock." In answer to this, would like to ask if one needed one barrel of flour would it be right to instruct the miller to send one and one-half barrels to ensure receiving a full barrel?

In regard to improper storage, it would be quite a task for one to estimate the amount of wastage from this source. The writer knows of three or four factories whose losses from improper storage are enormous, yet should one mention the fact to them their answer would be: "You are mistaken, for we always figure our losses high enough so that we lose nothing." While this may be true, yet I would like to ask of any one, isn't this rather a flimsy argument

If one had some faces to lay which required, say, 500 feet, and, after adding, say, 30 per cent. for loss, making a total footage of 650 feet, is it right that one should make it a special duty to see that the loss added should be destroyed, or would it be the better plan to cut the stock to an advantage and use this supposed wastage on some smaller work which had also been figured on, and at the same percentage of loss added?

It is not the writer's intention to specify any certain

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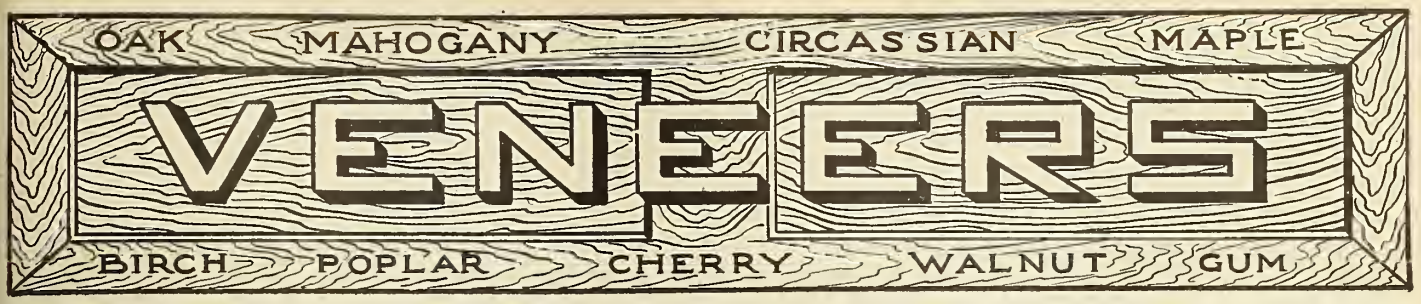

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sizes to be adhered to in cutting, as the age of the stock is quite a determining factor on the shrinkage. Why should one cut a centre core 4 or 5 in. longer than necessary just to be sure that it would be large enough, or why should one find it necessary to allow 1 in. for jointing and ripping on face veneers, when, by exercising a little care in piling the stock in the press, ½ in. would do? One can also effect quite a saving by using up what are termed scraps on irregular-shaped stock. Some of it may have to be glue-jointed, yet if this policy is adhered to one will effect quite a saving in one year. If the loss on the veneer was the only evil due to over-size cutting, we suppose that one would not think so much about it. When we consider the wastage of tape, glue, and time, we will find that the loss sustained can be quite heavy by the end of the year.

Another avenue to be guarded to prevent wastage is poor planer work on heavy centre cores. The writer has had a good many years of experience with veneering and veneered stock, but, to use a slang phrase, I had one put over on me a few days ago. We had delivered about 300 cores to the veneer mill, about 23 x 48 in. After running about one-half dozen pieces through the glue-spreader the superintendent of the veneer mill notified us that he could not use the cores, as they were full of holes, and, if laid, would be full of blisters. After some argument we decided to try 100 of them. The result was that we wasted about 800 feet of quartered oak faces. Of course, we got busy trying to locate the trouble, and we found one of an unusual kind. We first tried our double surfacing planer, where the dressing was done. While not being in what one could term first-class condition, yet the planer, so far as we could observe, was all right, and the source of trouble was surely due to some other cause. We then examined the electric grinder, which was found to be O. K. While we were discussing the situation, our planerman said that the pressure-bar behind the top head might be worn. Out came the pressure-bar, which we found to be about 1/16 in. concaved in the centre, but this was not altogether the source of our trouble. While being worn in the centre, the pressure-bar was also worn to a sharp edge, and, when feeding wide stock through the planer, the bar would act the same as a scraper knife. The result was an uneven face on the core.

One cannot exercise too much care in the handling of the stock when it has been delivered to the machine room. This is especially true when working any wood such as red gum, mahogany, and the numerous other species. If the faces should be loaded on the trucks face down, one will find those on the bottom full of nail holes. Again, should the operator, in picking up the stock, drag the corner of the pieces in his hand across the face of the one next to it, we find a deep scratch which is hard to sand out. The writer has watched stock pass through the machine and be delivered to the cabinet room in first-class shape, yet when the work was examined before it was delivered to the cabinetmakers we would often find stock bruised and scratched. The cause is rough handling, but if we will all have an abundance of patience and keep on hammering away, there are no doubt brighter days in store for all of us.

White lead, mixed with boiled oil, is said to be better than glue for door wedges. The doors should not be hung for several days, as this will give them a chance to dry and harden.

Dimension Stock Drying

A factor of considerable importance in connection with the dimension stock business is that of drying the material. Most of the dimension stock must be thoroughly dry before it is used, and the questions turn upon when and how to dry it.

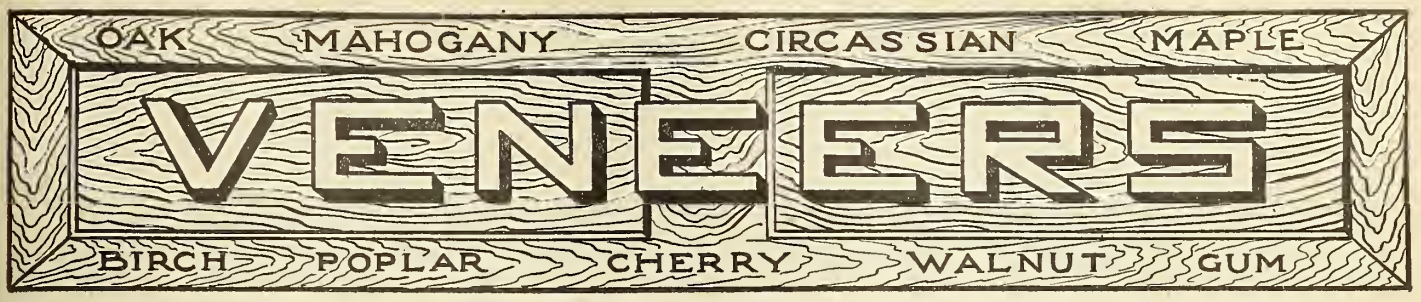
Much is reduced to its size from green timber and the drying is done afterward. In opposition to this, however, a concern quite prominent in dimension stock business, making a specialty of mahogany, follows the practice of thoroughly drying the lumber and flitches before working them into dimension stock. Ordinarily this would seem like waste of time and dry-kiln space, because it takes longer and requires more room to dry rough lumber than to dry the product after it is refined into dimension.

It would be hard to apply this idea in getting out oak and hickory dimension stock, especially where the dimensions are larger than could be obtained from ordinary inch boards. In making dimensions from regular lumber stock, say from 4/4 to 6/4 boards, there may be times when it would be best to dry the lumber and then cut it into dimensions. This may apply to maple and gum used in broom handle work, because the trimmings from the dried lumber would be already dry and ready to use for smaller dimensions like chair rungs, rods, and small turnings and mouldings. It might apply also in the ash handle trade.

There is room for an interesting investigation along this line, not only to determine when it is best to dry the lumber first, and when best to do the drying after the dimension stock is cut, but also to get light upon the best ways and means for handling different sizes and kinds of dimension stock to get it dry or seasoned in the best shape at the lowest cost.—Hardwood Record.

How to Loosen Screws

Many methods have been given from time to time as to the best way to "start" screws, and, of them all, the writer has come to the conclusion that the use of a good solid punch with a flat head of the same size as screw's, and a good, heavy hammer, is the best means to adopt, says a contributor to Everyday Mechanics. Suppose, for instance, we have to take an ordinary house door off its hinges, so as to get at its bottom edge to "ease" it (i.e., plane off a bit), in order that it can clear the carpet or door mat, and thus swing easily: Take the punch in one hand and place it fair and square against the head of the screw, and then give it a good blow with the hammer. This is more easily said than done if one is not at home with a hammer, for there is an instinctive fear of one's own fingers suffering. Therefore, in such circumstances, instead of an ordinary punch, procure, say, an old ¼-in. bolt, and place it so that, while you hold its threaded end, the head of the bolt rests upon the screw's head. Then your fingers, being well out of the way, a good blow may safely be delivered, and most probably will be, simply because knowing that no harm will occur to your fingers, there will be no hesitation in striking, and a true blow will result. The shock of such a blow has the effect of bending down the rust joint which is causing the screw to adhere so firmly to the wood. Once this joint is broken, or "started," as the mechanic would say, the rest becomes comparatively easy. It must be remembered, however, that a heavy hammer is necessary—light blows are no use and only tend to disfigure the screw head.



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NEW ALBANY, - - IND.

WALNUT

Lumber — Dimensions — Veneers

If you are in the market for anything in Walnut, let us figure with you. We have cut three million feet of Walnut in the last year, and have a good stock of all thicknesses dry. We can also furnish Walnut dimension—**Walnut Veneers.** We have a large stock of veneers, plain, stripe figured and stump wood.

Wood-Mosaic Co., Inc.

NEW ALBANY, - - IND.

TEAK

QUALITY QUALITY

Write for prices on all

Plain and Fancy Lumbers and Veneers

Mahogany, Oak, Birch, Walnut, Ash, Poplar, etc., rotary, sliced or sawed in all thicknesses

Your Patronage Respectfully Solicited

Prompt attention given to all enquiries, and SAMPLES SENT IMMEDIATELY ON REQUEST, or representative will call.

George Kersley

224 St. James Street, Montreal

QUALITY

MAHOGANY

QUALITY

We can ship

IMMEDIATELY

2 cars of 1/20 in. Unsel. Gum Veneer.
4 cars of 1/4 in. Unsel. Gum Veneer.
3 cars of 1/8 in. Unsel. Birch Veneer.
2 cars of 1/16 and 1/8 in. Red Oak Veneer.
15 cars of Panels, 3/16 to 1/2 in., in various woods.

GEO. L. WAETJEN & CO.

MILWAUKEE - - - WISCONSIN

Veneers and Panels

PANELS

Stock Sizes for Immediate Shipment. All Woods. All Thicknesses. 3 and 5 Ply or made to your specifications

VENEERS

5 Million feet for Immediate Shipment

Any Kind of Wood Any Thickness

We are Chicago agents for WOCO FIR PANELS, and carry a full and complete line in all stock sizes and all thicknesses at our Chicago warehouse for immediate shipment.

J. J. NARTZIK

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AT GRAND RAPIDS

READY TO SHIP

Poplar Crossbanding
Gum Veneers
Plain Oak
Quartered Oak
Mahogany

Immense Stocks — Right Prices

Write us

WALTER CLARK VENEER CO.

Grand Rapids

The Nugent Shaft Oiler

Several important reasons might be advanced to show why an efficient shaft oiler should prove a profitable purchase for the manufacturer. In the first place there is probably no more dangerous job in the factory than oiling shafting when it is necessary to climb up among revolving belts and pulleys; especially when an ordinary ladder is used.

Factory floors are usually slippery and the oiler is

With this appliance your oiler can stand on the floor and oil the shafting.

almost obliged to hold his breath or suffer the ladder to come tumbling down, perhaps with disastrous results. There are numerous other dangers. The oiler's attention may be called to something while he is engaged in his oiling, and with his mind off his job the end of his oil can or his clothing is liable to be caught in a revolving pulley. These dangers are not imaginary, as anyone who has had experience will testify.

With these dangers in mind it is quite easy to suppose that the oiling of shafting is liable to be neglected. And if this oiling is not attended to numerous troubles may develop. Bearings will burn out and shafting get out of line. This in turn will play havoc with pulleys and belts and cause expense and general unsatisfactory service.

The question naturally presents itself: Is it worth while to take a chance on the occurrence of these troubles when shaft oiling can be made safe and easy by the purchase of a comparatively inexpensive mechanical appliance? It hardly seems so.

Wm. W. Nugent & Company, of Chicago, manufacturers of the Nugent shaft oiler, which is illustrated herewith, claim that their shaft oiler makes the job safe and easy. This company also manufactures a full line of oiling and lubricating devices, oiling systems, oil filters, etc.

Read Brothers in New Quarters

The well-known Toronto wholesale lumber firm of Read Brothers are now occupying offices at 25 Toronto Street, with new telephone, Main 870. Their office was formerly located in the Aberdeen Chambers, 43 Victoria Street, which building was recently partially destroyed by fire. The fire was undoubtedly of incendiary origin, as when an inspection was made of the unburned portion of the building candles and oil-soaked shavings were found in every room. The candles were placed in blocks of wood, which had holes bored for the purpose. The oil-soaked shavings were then placed around the candles. Other evidences of incendiarism were also found.

Read Brothers state that, while they suffered some damage and inconvenience, they are now in an excellent position to take care of the requirements of their customers. Their stocks of crating lumber, spruce, and hemlock are well maintained, and they will be glad to receive enquiries regarding these items.

Do Shell Boxes Leave Profit?

The recent failure of three Montreal firms engaged in making shell boxes apparently bears out the statement often made, that contracts have been, and are, being taken at prices which either leave no profit or result in positive losses. The Imperial Munitions Board naturally buy in the cheapest market, and are not concerned if the prices are unremunerative. The fact seems to be that certain manufacturers, in their eagerness to get work, have so cut down prices that failures have followed or they have been unable to fill their contracts. This competition run mad has also reacted on the more solid firms, in that it has forced prices down to a level which, even with the best equipment and management, makes it difficult to secure a reasonable profit. Weaker firms have gone to the wall.

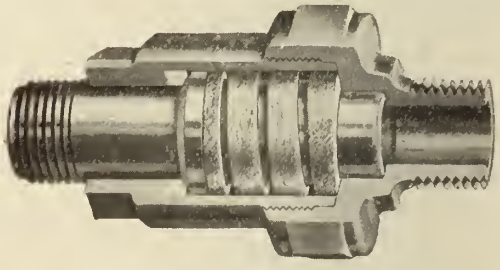
Manufacturers who have gone carefully into the entire position have stated that firms who have secured contracts at certain figures have clearly omitted to charge any overhead, or have taken chances which no prudent men should take.

The latest orders are stated to have been given out at low prices; and, with the cheap standard that has been established, it will be difficult hereafter to persuade the Imperial Munitions Board to pay prices which will mean a living profit.

According to information to hand, no more Bethlehem boxes are to be made in Canada—at any rate, for the present.

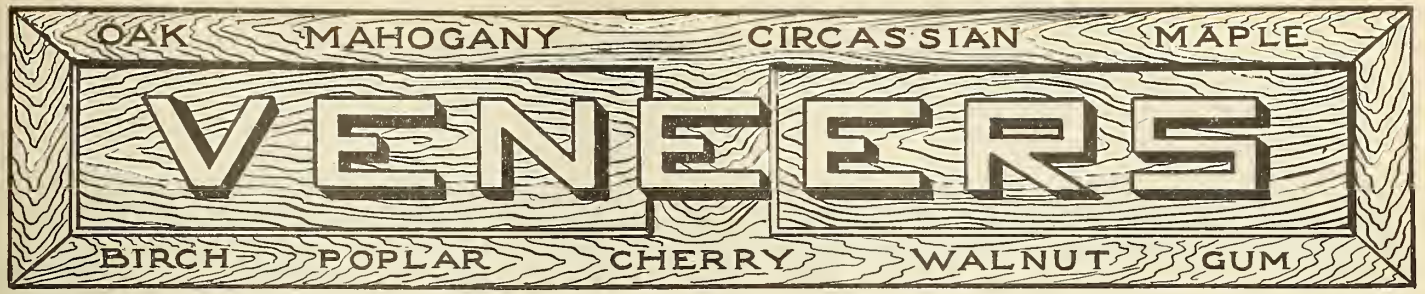
Swivel Joints for Pipe Lines

The accompanying illustration shows a swivel joint for use in steam, air, gas, and ammonia lines. These joints are known as the Knudsen Packless Swivel Joints, and are made by the Universal Valve Company, Burlington, Wis. Their main feature, as pointed out by the manufacturers, is that they do not require any packing, because the cast iron spring (cast iron being used in this case as it is for the manufacture of piston



The Knudsen packless swivel joint.

rings) permanently seats the joints and therefore eliminates the cost and annoyance of repacking the joint. They also point out that the cost of rubber or metallic hose serving as a conduit for these pipe lines is cut down in proportion to the cost of a permanent iron pipe line. In a number of cases where the Knudsen joints are in use common iron pipe is used for permanent and flexible lines.



AMERICAN WALNUT VENEER

Have you seen samples of the Wood we are producing?

A large line of the finest AMERICAN WALNUT VENEERS in Sliced, Half-Round and Stump Wood is ready for your inspection.

The beauty about it is its uniformity and can be matched by us at any time.

No freaks, but good solid substantial and well manufactured Veneer that causes a consumer to create his lines knowing that it can be maintained.

A wire or letter is all that is necessary.

Roberts Veneer Co., New Albany, Ind.

"The Pioneer Walnut Veneer Producers of America."

The Glue Book

WHAT IT CONTAINS

Chapter 1—Historical Notes
Chapter 2—Manufacture of Glue
Chapter 3—Testing and Grading
Chapter 4—Methods in the Glue Room
Chapter 5—Glue Room Equipment
Chapter 6—Selection of Glue

PRICE 50 CENTS

Woodworker Publishing Co Limited

345 Adelaide St. West, Toronto

The Lumber Market

Domestic Woods

There is practically no change in the local lumber situation. Prices are still firm and lumber firms are getting practically all the business they can handle without pushing for it. Furniture factories and woodworking plants throughout the country are fairly busy and the demand on the lumber firms, while not extraordinary, is steady. The majority of the furniture factories, while not producing to their full capacity are nevertheless turning out a pretty fair volume of goods.

We were inclined to believe that the sash and door business was practically dead, but on a recent visit to one of these plants we were informed by the owners that they were busy on sash with all the men that they could get. This plant was not a particularly large one, but it was well equipped. Local building in the suburbs of the city was responsible for the volume of work being turned out. Speaking generally the sash and door business is not very bright and this class of work is not calling very heavily on the lumber market.

From all accounts the production of logs in the woods this winter will be approximately on the scale of the quantity cut last winter. This will be just about enough to meet the demands of the present reduced requirements. Present indications are that lumber prices will henceforward be considerably higher than those that have prevailed during the past few months. Practically every item of expense is much higher than formerly and the producers will certainly want to get their own back from the stocks they cut.

It is very difficult to anticipate what the probable advances in prices may be owing to the continual fluctuating costs of labor and supplies. Then, of course, the labor at the mills where the logs are afterwards sawn will have to be taken into account. Labor for this work will likely be very scarce and high in price as conscription will take away all the single men.

Toronto prices for car lots on some of the more prominent woods are as follows:—White ash, firsts and seconds, 1½ and 2 in., $79; birch, firsts and seconds, inch, $58; basswood, firsts and seconds, inch, $51; soft elm, firsts and seconds, inch, $47; rock elm, firsts and seconds, 1½ and 2 inch, $65; soft maple, firsts and seconds, inch, $48; hard maple, firsts and seconds, inch, $51; Douglas fir, Nos. 1 and 2, 1 inch, clear, $50.75.

Imported Woods

In the Southern States just now lumber manufacturers are engrossed in the business of cutting and shipping materials for the government, special attention being paid to the production of shipbuilding material. After some delays the specifications have been arranged and manufacturers know just what they will have to produce. They are, therefore, now bending every energy toward a maximum production of this material.

A survey of the general lumber situation in the United States at this time shows three important facts: There is a growing scarcity of lumber that will preclude the possibility of lumber manufacturers in any section of the country operating their mills to full capacity, thus making certain a considerable reduction in the output of the mills and laying at rest any fear of an over-production; the car shortage despite the greater efficiency and speed in car movement that have been developed by the Railroad War Board is becoming more acute and in fact already has become pronounced in some parts of the lumber producing section and is expected to grow worse until the crop movement has ended.

Probably the most serious difficulty with which the lumber trade will have to contend for some time will be the question of transportation. Cars will be provided for the movement of materials required by the government, but indications are that few cars will be available for the movement of other lumber. In view of this fact it would seem advisable for manufacturers to immediately get in touch with the market and cover their requirements, as lengthy delays in deliveries must be expected. One of the great trunk lines serving the Pacific Northwest has advised lumber shippers that box cars will not be supplied for the transportation of lumber. This leaves only flat cars in which lumber can be shipped, and it is stated that the southern lumber firms cannot expect to secure a very large supply of flat cars because of the movement of the cotton crop.

The labor situation in the southern lumber producing centres is said to be particularly acute as a result of a withdrawal of labor into other lines that has created a general shortage. A little improvement has been noted in the labor situation in the North. In fact wherever lumber is produced there is a shortage of labor and labor costs have been increased very materially. Reports from producing and distributing centres are said to indicate a steadily expanding demand for southern hardwoods, and while the grades called for still is for the lowest grades, a fair amount of business is being done in the higher grades.

Due to the heavy demand from manufacturers of boxes and other wood containers there is notable activity in the lower grades of cottonwood and gum, while because of the heavy government orders for trucks and wagons, manufacturers are experiencing a big demand for thick stocks of gum, ash, oak, maple, hickory, elm, etc. Low grade poplar, gum and cottonwood are in good demand from the box makers, while the musical instrument trade calls for veneers and high grade dimension stocks in satisfactory volume. Manufacturers of hardwoods in the United States who are in a position to supply clear ash lumber for airplane construction have no trouble in marketing all they can make; in fact airplane factories are said to be searching the country for additional sources of supply of this material.

It will therefore be apparent that no immediate reduction in prices need be looked for. In fact with the steady demand and the decreased production, increases on some items might reasonably be expected. Current prices quoted at Boston are firm and practically unchanged, as follows:—Oak, quartered, $92 to $95; plain, $69 to $74; ash, $72 to $74; basswood, $59 to $65; birch, sap, $62 to $65; red, $72 to $75. Sound wormy chestnut, 1 inch, $35; plain chestnut, 1 inch fas., $51; poplar, 1st and 2nds, $69 to $73; saps, inch, $57 to $60.

Weeding out inefficient men may help the business, but it doesn't solve the bigger question of what to do with, or for, the men weeded out.

ATCO ABILITY

WE sincerely believe you should go as far in your present purchases of southern hardwoods as is consistent with your individual conditions. War needs are more and more insistent in their demand. But of more sinister significance is the promise of totally inadequate manufacturing possibilities during the winter on account of growing labor and car troubles.

We are able to handle your business now for well assorted stocks in Gum, Oak, Cottonwood, Elm and Ash lumber and in Gum Core stock, crossbanding, drawer bottoms and panels. We cannot, though, say how long our stocks will stand the strain of increasing government pressure and decreasing manufacturing facilities. One thing is certain though, namely, that the inevitable trend of prices will be upwards and of available stocks downward.

We believe our suggestion will stand your most careful investigation.

GOLDEN RULE QUALITY

Anderson Tully Company
Memphis

News of the Trade

Dafoe & Waller, sash and door manufacturers, Napanee, Ont., have sold out to W. D. Widmer.

W. Williamson, Toronto, Ont., is erecting a frame planing mill at 601 Woodbine Avenue, to cost $3,500.

The Crooks-Keeley Furniture Company, Ltd., has been incorporated at Calgary, Alta., with capital of $20,000.

The McFarlane Ladder Works, 160 River Street, Toronto, are erecting a new storage building at their factory.

The Parry Sound Lumber Company have decided to leave over until spring the rebuilding of their planing mill, which was recently destroyed by fire.

J. H. Connor & Son, Ltd., of Ottawa, Ont., manufacturers of washing machines, etc., are making some alterations to their factory.

The name of the Berlin Interior Hardwood, Ltd., of Kitchener, Ont., has been changed to the Interior Hardwood Company, Ltd.

The planing mill owned by the Peterboro Lumber Company at Peterboro, Ont., which was recently destroyed by fire, will be rebuilt.

John McIntyre, of Rodney, Ont., is undecided when he will commence work on his planing mill. In all probability it will be started in the spring.

The North American Bent Chair Company, of Owen Sound, Ont., has recommenced operations. The plant has been shut down for some time, as a result of their recent fire.

From 15 to 25 per cent. less power is required to drive a

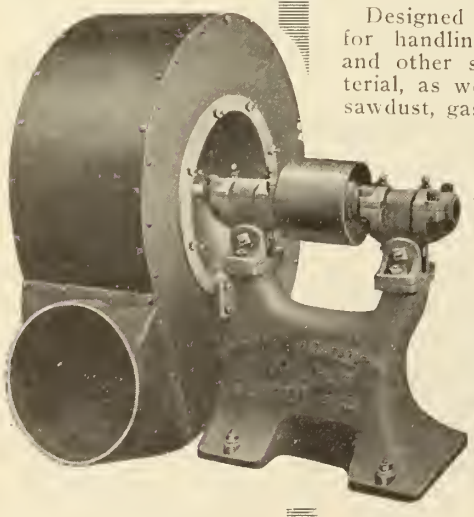
CANADIAN

Slow Speed Reversible

Mill Exhauster

than any other high-speed fan.

Designed especially for handling shavings and other stringy material, as well as bark, sawdust, gases, etc.



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Canadian Blower & Forge Co., Limited

Kitchener, Ont.

The Andrew Malcolm Furniture Company, Ltd., of Kincardine, Ont., are erecting a 90 x 60 ft. four-storey addition to their Listowel plant. The new addition will be used for packing room and storage purposes.

The Magnet Toy and Novelty Company, Ltd., of Port Hope, Ont., which recently obtained a charter, is getting its equipment installed. The company expect to commence operations about the first of the year.

William Rutherford & Sons Company, Ltd., Montreal, have obtained the contract for the millwork and lumber for the hospital to be erected at St. Anne de Bellevue, P.Q., for the Military Hospitals Commission. The contract is an exceptionally large one.

The plant of the Cranbrook Sash and Door Company, Ltd., Cranbrook, B.C., recently suffered a loss of about $40,000 by fire. The planing mill, glazing room, sash and door manufacturing plant, platforms, dry kilns, and storage sheds were totally destroyed. The amount of insurance on the buildings was very light, amounting to only $6,000.

A new company, chiefly composed of Pembroke men, has been formed to take over the plant and business of the defunct Hardwood Specialties Company, of Pembroke, Ont. The new company will be known as the Union Box and Shook Mills, Ltd. The capital of the new company is $150,000. Among those interested are J. H. Reeves, J. R. Lockhart, and W. F. Behan.

The capital of Veneers and Panels, Limited, recently incorporated, is $500,000. The company are constructing at St. Jerome, P.Q., a factory for the manufacture of veneers from Canadian hardwoods, including birch, maple, elm, ash, and also basswood. The plant—the only one of its kind in Canada—will not be ready until the spring. Mr. H. Lefeber is the manager.

At the recent annual convention of the National Safety Council in New York, Mr. F. G. Lovett, inspector for the Industrial Accident Prevention Association of Canada was elected vice-chairman of the Woodworking Section. Mr. Lovett delivered an interesting address to the council on "Rip-saw Accidents and Their Prevention. The address is published elsewhere in this issue.

The foreman of the artificial limb factory of the Military Hospitals Commission at Toronto has worked out an ingenious artificial arm for returned soldiers. The arm is fitted with two hands—one for looks and the other for speed. For week-days' use a double steel hook which grips by means of a steel clamp is fitted to the arm. This contrivance has a knuckle joint adjustment, is removable at the wrist, and is said to be very easily adjusted. For evening wear, Sundays, and "occasions" the artificial hand is attached. The government limb factory has the right to avail itself of any patent device in limb manufacturing and even greater improvements may be made. Constant experimenting is going on.

Brigadier-General Sir A. Bertram, late chairman of the Imperial Munitions Board, told the members of the Canadian Society of Civil Engineers, Montreal, that about 25,000,000 shell boxes had been manufactured, adding: "I shall never forget the shell box situation." At the same meeting a statement was made to the effect that, "if placed end to end, the boxes in which the shells were shipped would make a single line from Victoria, B.C., to London, Eng., with sufficient left to be placed three abreast, reaching from London to Berlin. These boxes, when piled solidly on St. Catherine Street, Montreal, would fill it from wall to wall to a height of 50 feet, a length of four miles, and, if built solidy on Dominion Square, covering the entire portion of the square below Dorchester Street, would make a solid cube reaching to the height of 1,750 feet."

Felger Lumber & Timber Company

Manufacturers and Wholesalers

Cuban Mahogany

We carry a complete stock of Cuban Mahogany in Grand Rapids as well as at our mill in Havana, and can make prompt shipments.

Southern Hardwoods

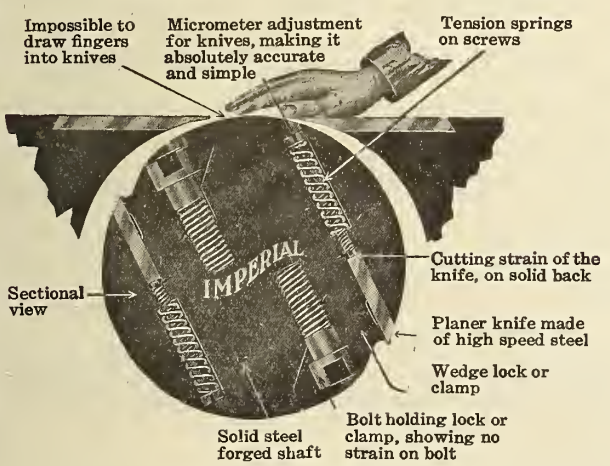
We Specialize in

Gum, Oak, Chestnut and Poplar.

Grand Rapids, Michigan

Suite 733 Michigan Trust Bldg.

Protect Your Men


Impossible to draw fingers into knives
Micrometer adjustment for knives, making it absolutely accurate and simple
Tension springs on screws
IMPERIAL
Sectional view
Cutting strain of the knife, on solid back
Planer knife made of high speed steel
Wedge lock or clamp
Solid steel forged shaft
Bolt holding lock or clamp, showing no strain on bolt

Protect your men against accidents and you protect yourself against liability damages.

"Imperial" Round Safety Cylinders can be installed on all of your buzz planers and jointers. They prevent accidents, require less power, make less noise and have a micrometer adjustment.

Imperial Machinery Co.

230 Ionia Ave. - Grand Rapids, Michigan

Please examine this list of

Hardwoods

1 car 4/4 in No. 3 Com. Black Ash.
3 cars 4/4 in. No. 2 Com. and Btr. Black Ash.
3½ M. 6/4 in. No. 1 Com. and Btr. Black Ash.
4 cars 4/4 in. No. 3 Com. Birch.
1 car 6/4 in. No. 1 Com. and Btr. Birch.
1 car 8/4 in. No. 1 Com. and Btr. Birch.
3 cars 4/4 in. No. 2 Com. and Btr. Basswood.
1 car 4 x 6 in. Birch and Maple Hearts.
2 cars 8/4 in. No. 2 Com. and Btr. Birch and Maple (about 80 per cent. Birch).
2 cars 4/4 in. No. 3 Com. and Btr. Soft Elm.
2 cars 8/4 in. No. 1 Com. and Betr. Soft Elm.
1 car 12/4 in. No. 1 Com. and Btr. Soft Elm.
1 car 5/4 in. No. 2 Com. and Btr. Hard Maple.
3 cars 6/4 in. No. 2 Com. and Btr. Hard Maple.
2 cars 8/4 in. No. 2 Com. and Btr. Hard Maple.

Guaranteed not over 10 per cent. No. 2 Com. in last three items.

All dry stock and nicely manufactured

We should like to quote you

Graves, Bigwood & Co.

Manufacturers of

PINE
HEMLOCK
HARDWOOD } **LUMBER**

TORONTO OFFICE:
712 Bank of Hamilton Bldg.

MONTREAL OFFICE:
327 Coristine Bldg.

Mills at—Byng Inlet, Ont.
and
Deer Lake, Ont.

Innovation in Railway Car Work

From the Railway Review we learn that a notable innovation has been introduced on the Pennsylvania Railroad in the method of painting their passenger coaches; it has worked successfully for over four years and may now be taken as established on the railway. A large oven is used which takes in a complete carriage, and the process of painting is, briefly, as follows:—

The car is first painted complete, both inside and outside with priming coat, run into the oven and kept there for three hours under a temperature of about 250 degs. F. It is then removed, putty is applied to fill up all depressions and the surface glazed, after which a number of surface coatings are applied dependent on the nature of the surface of the steel of which the coach is built. Sometimes a single coat suffices, sometimes as many as four coats have to be applied to give the necessary body. After the application of each coat it is baked. The surface of the coach is next rubbed smooth with emery cloth and oil till it it quite smooth and flat. The various colors, as required, are then applied in two coats, each coat being subjected also to baking. The striping, lettering, etc., is then added and the surface is given two or three coats of high grade baking finishing varnish which complete the process, but on the inside some of the gloss of the varnish is removed by rubbing.

The oven, which is 90 ft. 3 ins. in length, is heated by means of steam coils, there being a control which regulates the flow of steam to the coils and thus gives any desired temperature. It is lined with a ½ inch steel shell insulated with magnesia lagging 3 inches thick; and behind the lining is a jacket of galvanized iron. The doors are insulated with the same kind of lagging which is held in position by steel plates on the outer and inner sides. There are ventilators on the sides for the admission of air and also four roof ventilators for the volatile elements of the paints. This system of oven baking is particularly suited to steel coaches which expand and contract under temperature effects twice as much as wooden coaches, so that naturally the paint on them is more liable to crack.

Artificial driers dry in from one to two days' time, but they continue to act in a slight degree for a long time after, making paint or varnish slowly more hard and brittle and so more liable to crack or disintegrate under expansion and contraction. Careful experiments were first made by the chemical and physical testing departments of the Pennsylvania Railway together with the master painters which showed that by baking each coat of paint or varnish the use of artificial driers could be largely or entirely eliminated; that once the heated air has dried therein no further change occurs in their condition. Hundreds of such tests were made on small panels, then in 1913 a full sized oven was got ready which has been in continuous service ever since. A car painted by means of it has been in continuous service for 34 months and remains quite good; it is to run so for another three or four months and then is to be returned to have the color touched up only where abraded, then varnished by the baking process and returned to service. Two additional ovens are now being provided, and it is probable more will follow. The following advantages are claimed for the system:—

(1) The durability of the various coatings is doubled.

(2) The inside appearance of the coach continues as good as new for a very long time and there is no cracking of the varnish.

(3) The outside of the coach is not embedded with black dirt and soot and consequently remains bright and clean for a long time.

(4) The time for keeping a coach in the shop for painting is reduced from 16 to 5 days.

(5) The number of coaches in the shop at any one time is not over one-half the number under the old system.

It is easy enough to figure out either failure or fortune on paper, but it is a different thing when you come to making these things in real life.

HEMLOCK and SPRUCE

2″ No. 1 Hemlock—assorted widths and lengths
1 x 4 and 5 Mill Run Spruce—Culls out

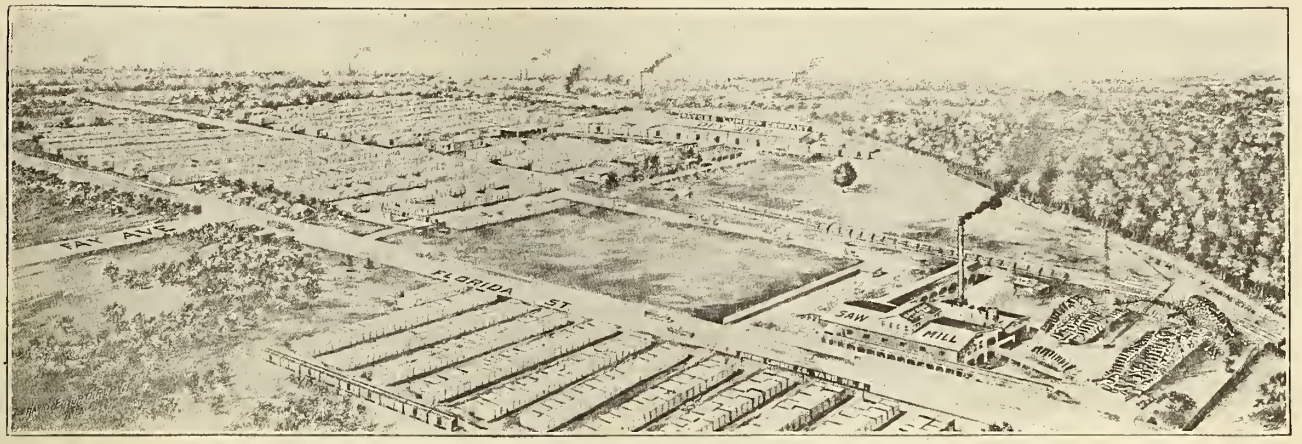
New Address—25 TORONTO ST.
New Telephone number—MAIN 870

Read Bros., Limited
Toronto -:- Canada

The Bennett Lumber Co. Limited
Solicit your enquiries for
Mahogany, Walnut, Oak, Poplar, Gum
and all other American HARDWOODS in all grades and thicknesses.

CANADIAN SPRUCE, PINE and BIRCH LUMBER

Long Distance Phone Main 812 11 St. Sacrement St. MONTREAL, P.Q.



Band Mill and Yards, Memphis Plant

"Direct from Producer to Consumer"

STOCK READY FOR SHIPMENT:

Plain Red Oak
3/4 in. 4,000 ft. C and B.
4/4 in. 90,000 ft. F A S.
5/4 in. 175,000 ft. F A S.
6/4 in. 60,000 ft. F A S.
8/4 in. 60,000 ft. F A S.
12/4 in. 50,000 ft. C and B.
4/4 in. 25,000 ft. No. 1 Com.
5/4 in. 340,000 ft. No. 1 Com.
6/4 in. 70,000 ft. No. 1 Com.
8/4 in. 150,000 ft. No. 1 Com.
5/4 in. 14,000 ft. No. 2 Com.

Qrtd. Red Oak
4/4 in. 20,000 ft. F A S.
4/4 in. 40,000 ft. No. 1 Com.
5/4 in. 3,000 ft. No. 2 Com.

Ash
4/4 in. 2,000 ft. F A S.
5/4 in. 2,000 ft. F A S.
30,000 ft. No. 1 Com.
6/4 in. 2,000 ft. F A S.
8/4 in. 10,000 ft. No. 1 Com.
10/4 in. 1,000 ft. No. 1 Com.
12/4 in. 2,000 ft. No. 1 Com.

Cypress
4/4 in. 3,000 ft. Shop.
3,000 No. 1 Com.
6/4 in. 5,000 ft. F A S.
2,000 ft. Select.
2,000 ft. Shop.
1,000 ft. No. 1 Com.

Elm
4/4 in. 12,000 ft. L R.
8/4 in. 50,000 ft. L R.
10/4 in. 7,000 ft. L R.

Plain White Oak
4/4 in. 30,000 ft. F A S.
5/4 in. 10,000 ft. F A S.
6/4 in. 50,000 F A S.
8/4 in. 50,000 ft. F A S.
12/4 in. 30,000 ft. F A S.
5/4 in. 20,000 ft. No. 1 Com.
6/4 in. 15,000 ft. No. 1 Com.
8/4 in. 50,000 ft. No. 1 Com.

Qrtd. White Oak
3/4 in. 1,000 ft. F A S.
4/4 in. 75,000 ft. F A S.
5/4 in. 88,878 ft. F A S.
6/4 in. 39,000 ft. F A S.
8/4 in. 6,000 ft. F A S.
3/4 in. 1,900 ft. No. 1 Com.
4/4 in. 35,000 ft. No. 1 Com.
5/4 in. 80,000 ft. No. 1 Com.
6/4 in. 44,000 ft. No. 1 Com.
8/4 in. 6,000 ft. No. 1 Com.
5/4 in. 7,000 No. 2 Com.
6/4 in. 2,000 No. 2 Com.
8/4 in. 1,000 No. 2 Com.

Qrtd. W. O. Strips
4/4 in. 13,000 ft. C F.
4/4 in. 29,000 ft. No. 1 Com.

Cottonwood
4/4 in. 30,000 ft. F A S.
174,000 No. 1 Com.

Tupelo
4/4 in. 40,000 ft. F A S.
4/4 in. 30,000 ft. No. 1 Com.

Plain Red Gum
4/4 in. 50,000 ft. No. 1 Com.
5/4 in. 120,000 F A S.
150,000 ft. No. 1 Com.
6/4 in. 160,000 ft. F A S.
120,000 ft. No. 1 Com.
8/4 in. 3,000 ft. F A S.
11,000 ft. No. 1 Com.

Qrtd. Red Gum
4/4 in. 750 ft. F A S.
9,000 ft. No. 1 Com.
8/4 in. 140,000 ft. F A S.
150,000 ft. No. 1 Com.

Plain Sap Gum
3/4 in. 80,000 ft. No. 1 Com.
4/4 in. 10,000 ft. F A S.
80,000 ft. No. 1 Com.
5/4 in. 250,000 ft. F A S.
160,000 ft. No. 1 Com.
6/4 in. 350,000 ft. F A S.
320,000 ft. No. 1 Com.
8/4 in. 3,000 ft. F A S.

Qrtd. Sap Gum
6/4 in. 370,000 ft. F A S.
290,000 No. 1 Com.
8/4 in. 350,000 ft. F A S.
35,000 ft. No. 1 Com.
10/4 in. 100,000 C and B.
12/4 in. 100,000 ft. C and B.

Cedar
4/4 in. 10,000 ft.

Maple
4/4 in. 400 ft. L R.

We are running both our mills, regularly, producing, in addition to the above, stock not listed herein.

LET US QUOTE YOU

GAYOSO LUMBER COMPANY

MEMPHIS, TENNESSEE

Cost Accountant

Ineligible for Overseas Service, having had four years' experience in Mill Work Costs, and an additional three years as an assistant with one of the foremost Accounting firms of Canada, desires a position where he can control and operate the cost accounts of a large woodworking and contracting concern. Good references.

Mr. Howe, 1401 Royal Bank Bldg., Toronto.

FOR SALE
BOX MACHINERY

One dovetail machine.
One setting up machine.
One four saw trimmer—self feeding, made by Dovetail Machine Co., St. Paul, Minn.
One No. 22 Box trimmer, made by Fisher Machine Works, Chicago, Ill.
All cost $3,300; will guarantee and sell at a bargain. Inquire of The Globe Soap Company, Cincinnati, Ohio.

Machinery For Sale

Acting on instructions from the assignees we have for sale the balance of the machinery equipment of a large Box Factory in Winnipeg. Also we have many other special woodworking tools to dispose of. The following is a partial list:—

4 Power Feed Rip Saws.
1 American Combination Saw and Dado Machine
1 C. M. C. Tilting Table Saw.
1 Cowan Tilting Table Saw.
1 McGregor-GourlayTilting Table Saw
2 Cowan N-255 Chain Saw Mortisers
1 New Britain No. 7 Chain Saw Mortiser.
1 New Britain No. 2 Chain Saw Mortiser.
1 Set Beach Boxmakers Saws.
1 Set Cowan Boxmakers Saws.
1 Berlin 54 in. No. 289 Band Resaw.
1 Berlin H-471 Glue Jointer
1 Outfit Band Resaw Fitting Machinery
1 Emery Grinder on Pedestal
1 Robinson Band Saw Setting Machine
1 Dowel Machine with six heads
1 Cowan Horizontal Band Resaw ((Hopper Feed)
1 Nichols Arm Sander (American)
2 Turning Lathes
1 McGregor-Gourlay 24 in. Planer and Matcher
1 McGregor-Gourlay Double Spindle Shaper
6 Sections Cowan Vencer Press 12 in. x 38 in.
1 McGregor-Gourlay 16 in. Buzz Planer
1 Cowan 24 in. Buzz Planer
1 Cowan M-210 Double Surfacer
1 Hespeler 10 ft. Belt Sander.
1 Schinnel-Reid 8 ft. Belt Sander
1 Greenlee Sash Relisher & Hollow Chisel Mortiser
1 Outfit Morgan Lock Corner Machinery
1 A.B.C. Planing Mill Exhauster and Piping, 60 in. Single
1 30 in. Single Planing Mill Exhauster
1 60 in. Double A.B.C. Planing Mill Exhauster and Piping
1 60 in. Columbia Sander
1 set Hayes Dowel Door Machinery
4 Heavy Moulders
3 Sash Stickers
1 Pony Planer
1 Upright Chisel Mortiser
1 Locomotive Boiler 25 to 30 H.P., complete with stack
1 Lighting Outfit, Engine, Generator and Panel (150 lights)
1 "Murray" Corliss 18 in. x 36 in.
1 "Atlas" Corliss 125 h.p.
2 Motors, 30 H.P., 1120 R.P.M.
Large quantity Shafting, Pulleys and Hangers.

For prices write

J. L. Neilson & Co.
Winnipeg, Man.

t.f.

WANTED

A first-class energetic resourceful manager for a new, well-equipped chair plant in a good live furniture town, advantageously situated.

One who understands the business from the ground up, and who can take full charge of manufacturing.

A good opportunity for ability to display itself. A man who can associate himself with a concern financially preferred. Apply Box 28, Canadian Woodworker, Toronto, Ont.

Barrel Tests

The fact that the oak tree furnishes most of the timber for tight cooperage in the United States, has led the Forest Products Laboratory at Madison, Wis., to make an extensive study of its characteristics.

The laboratory has conducted tests in co-operation with the Bureau for the Safe Transportation of Dangerous Explosives, in order to obtain data upon which specifications and changes in the design of wooden barrels used in the transportation of dangerous liquids might be based. These tests were made entirely upon white oak barrels, and indicated that for barrels of this species and class the following main faults in design should be remedied:

1. The two middle hoops (bilge hoops) were too wide apart.
2. The weakest parts of the barrels were the heads.
3. The staves had not been graded on a basis of strength, some staves having less than one-fourth the strength of others.

The following remedies were suggested, and have been partially put into effect commercially:

1. The bilge hoops should be moved closer together.
2. The heads should be about one and one-half times the thickness of the staves, instead of the same thickness; and the head joints (weakened in practice by dowel holes) should be improved.
3. More attention should be paid to selecting material of a high dry weight per cubic foot.

Wages of Woodworkers in Switzerland

In March, 1917, the Woodworkers' Federation of Switzerland undertook a statistical inquiry into the current wages of woodworkers in the various sections of the federation. The results of this inquiry were published in the official organ of the federation, and show an average wage in 24 principal towns of 13.6 cents per hour.

These wages are in the main those of carpenters and joiners. In a number of towns the inquiry included also special branches of woodworking, and it was found that the average wage of inlaid-floor makers was 19.3 cents in Basel and 22.3 cents in Berne and Zurich.

WATCHMAN'S CLOCKS
Hardinge Portable
The only unlimited System.
Patrol clock, each $39.60 complete.
Stations, any number needed $4.10.
Also Key Type Clocks, limited capacity.
F.O.B. Toronto. Write for catalogues.
SIGNAL SYSTEMS, LIMITED
110 Church Street - - Toronto

PETRIE'S
November List
of
NEW and USED
WOOD TOOLS
in stock for immediate delivery

Wood Planers
30" Whitney pattern surfacer.
26" double surfacer.
24" Single surfacers, various makes.
24" Champion planer and matcher.
16" C.M.C. timber sizer.
24" Jackson-Cochrane

Band Saws
54" Jackson-Cochrane re-saw.
28" Ballantine, bracket.
26" Crescent pedestal (2).

Saw Tables
No. 3 Crescent, universal.
No. 5 Crescent, sliding top (2).
Ballantine variable power feed.
No. 257 Berlin power-feed rip.
12' Defiance automatic equalizer.
MacGregor Gourlay railway cut-off.
Greenlee automatic cross-cut.
Canadian steel frame pole saw.
5½' Crescent, swing.

Mortisers
Cowan hollow chisel, M190.
Galt upright, compound table.
No. 5 New Britain, chain.
No. 2 Smart foot power.

Moulders
13" Clark-Demill four-side.
12" Cowan four side.
12" Woods four-side.
10" Houston four side.
8" Dundas four-side.
7" Cowan double head.
6" Cowan four side.
6" Dundas sash sticker.

Sanders
24" Fay double drum.
12" C.M.C. disk and drum.
18" Crescent disk

Clothespin Machinery
Humphrey No. 8 giant slab resaw.
Humphrey gang slitter.
Humphrey cylinder cutting-off machine.
Humphrey automatic lathes (6).
Humphrey double slotters (4).

Miscellaneous
Elliot universal woodworker, with motor.
Fay & Egan 12 spindle dovetailer.
MacGregor Gourlay 12 spindle dovetailer.
Cowan dowel machine, M80.
No. 1 Ballantine dowel machine.
Crescent post boring machine.
Egan sash and door tenoner.
Dundas double-head tenon machine.
18" Trevor box heading turner.
Cowan sash clamp, M137.
No. 4A Fox wood trimmer.
Dougherty horizontal shingle machine.
Waterous lath machine.
26" Dominion lath trimmer.
MacGregor-Gourlay 2-spindle shaper.
Defiance shovel handle shapers
48" 3 saw edger.
20" American wood scraper.
3" Pringle & Brodie variety wood lathe.
4-head rounding machines.
Cowan spindle carver, M63.
No. 1 Hart automatic saw filer.
No. 104 Covel band-saw roller.

Prices, Descriptions and Full Particulars on Request

H. W. PETRIE, LTD.
Front St. W., Toronto, Ont.

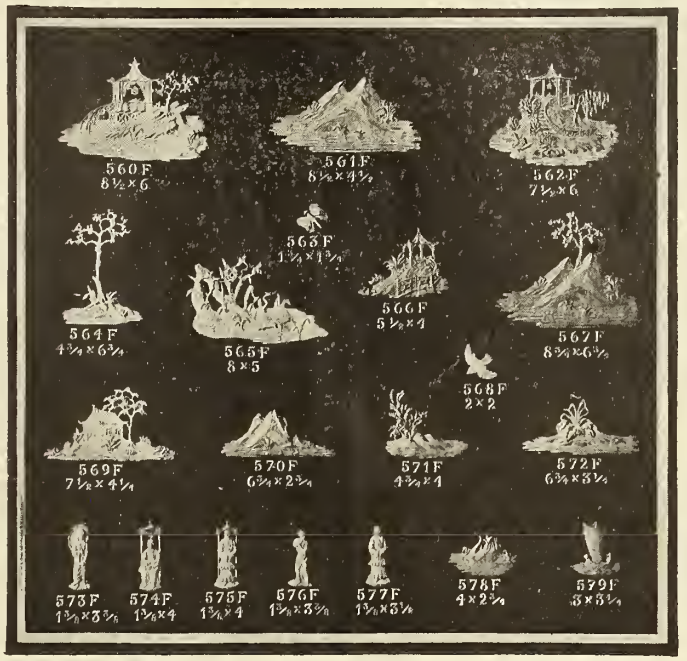
CARVINGS FOR PERIOD FURNITURE

Composition Carvings

are now extensively used for furniture decorations.

This is a material that will interest all manufacturers of furniture.

Write for Catalog and prices.



Most durable and practical Carvings on the market.

We have thousands of stock designs in all the different styles; can also manufacture according to your special designs.

Samples sent on equest.

DECORATORS SUPPLY CO., Archer Ave. and Leo St., Chicago, Ill.

THE COMPLETE LINE

IS DISTINGUISHED FOR ITS FINISH

THE ORIGINAL FINISH of the early English furniture, mellowed by age, is extremely beautiful. Not a little of this effect is due to the antique finish of the brass trimmings.

FOSTER MERRIAM & CO. have successfully developed ***"YE OLDE ANTIQUE FINISH"*** and have applied it to their complete line of brass trimmings.

Our Canadian Representative is at your service.

FOSTER, MERRIAM & CO., Meriden, Conn.

Grand Rapids	Chicago, Ill.	New York City	High Point, N.C.	Canadian Office
Leonard Exhibition Bldg.	69 W.Lake St	225 Canal St.	A. T. Wishart, Mgr.	31 Weber St. W., Kitchener, Ont.

E. H. Shreiner Lumber Company

EXCLUSIVELY WHOLESALE

Band Mill—West Salisbury, Pa.

General Offices—PITTSBURGH, Pa.

5 Cars 4/4 1's and 2's Red Oak

and

10 Cars 4/4 No. 2 Common Red Oak

Band Sawn West Virginia Stock

SPECIAL

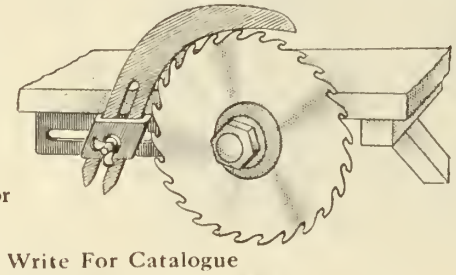
Watch this space each month for Specials.

WHY PAY MORE?

The CHEAPEST and SIMPLEST

SPLITTER SAW GUARD

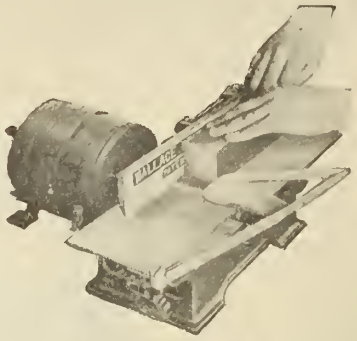
Does the work for saws of any diameter



Write For Catalogue

Gustafson & Scott Mfg. Co.

4315 Wabansia Ave. (NOT INC.) CHICAGO, ILL.



THE WALLACE BENCH PLANER

is the Powerful Little Machine which will increase your output and decrease your costs. Should be used in every Pattern, Cabinet, and Woodworking Shop.

Either Motor or Belt Driven.
Write us for Price and Circular

AGENTS

THE FOSS & HILL MACHINERY CO.

305 St. James St. MONTREAL, Que.

Attractive

Substantial

Low Priced

Furniture Trimmings

Our line is large and varied, comprising all Period Designs

SAMPLES UPON REQUEST

The Burns & Bassick Company

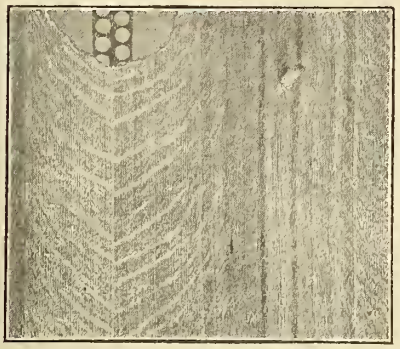
Division of

THE BASSICK COMPANY

BRIDGEPORT - CONNECTICUT

Double Perforated Tape

for Crossbanding

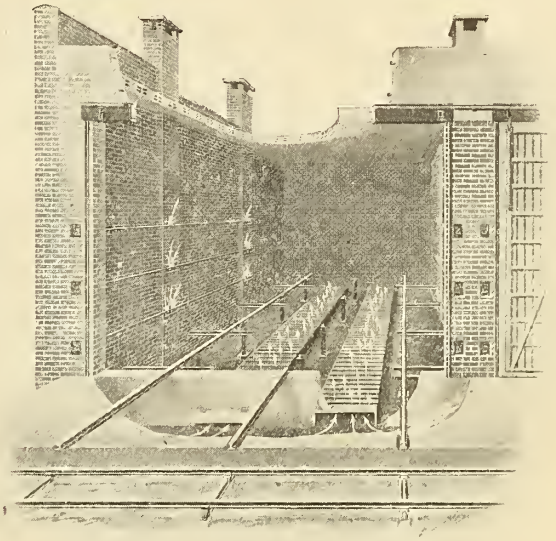


See the perfect joints in the illustration, which is an exact reproduction of a portion of a panel made by a manufacturer who is using this tape regularly. Nothing to compare with it for this work.

IDEAL COATED PAPER CO.

Veneer Tape Specialists

Main Offices and Mills, BROOKFIELD, Mass.



NATIONAL DRY KILNS

are designed in all shapes, numbers and sizes, for every kind of drying work. Complete service and equipment is included. All plans and specifications are furnished without charge or royalty. You receive material value for every dollar you spend.

Write us for catalog.

THE NATIONAL DRY KILN CO.

1117 East Maryland St., INDIANAPOLIS, Indiana

The Logical Wheel for Knife Grinding

is the wheel that cuts cool, fast and free—a wheel that does not burn the knife edge or draw the temper—one that will hold its shape, show long life and require but little dressing.

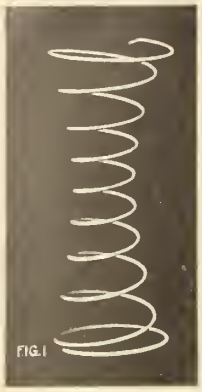
The logical wheel for knife grinding is the

Aloxite Wheel

Our service department will see to it that you get just the right wheel for your particular knife grinding job.

THE CARBORUNDUM COMPANY, NIAGARA FALLS, N. Y.

NEW YORK CHICAGO PHILADELPHIA BOSTON GRAND RAPIDS MILWAUKEE CINCINNATI CLEVELAND PITTSBURGH



FOSTER SPRINGS

"The Line of Dependability"

We cover the entire field of upholstery requirements. Our long experience in spring making enables us to render you a valuable service in expert advice and we solicit an opportunity to aid you in working out your problems. Our facilities insure a prompt and careful execution of your order.

We are furnishing high grade goods at best values in furniture springs, pillow springs, single cone springs and helicals.

Constructions for chairs, rockers, davenports and settees.

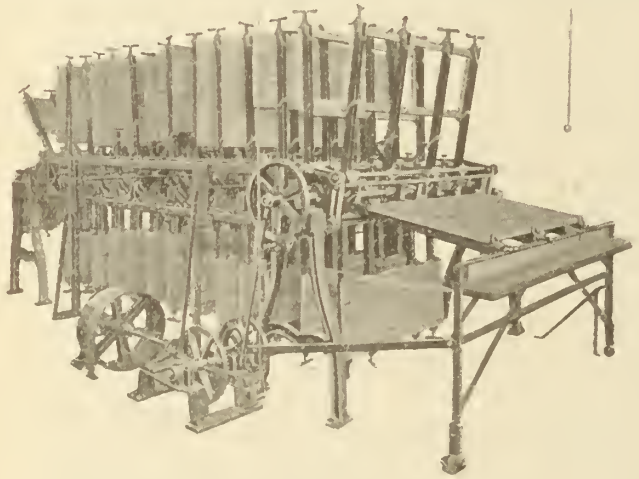
The Luxury Spring for filling of top cushions over Foster Springs or constructions is the "Ideal" combination.

We solicit your inquiries

FOSTER BROS. MFG. CO., Utica, N.Y., U.S.A.

Billstrom

Glue Clamp Carrier



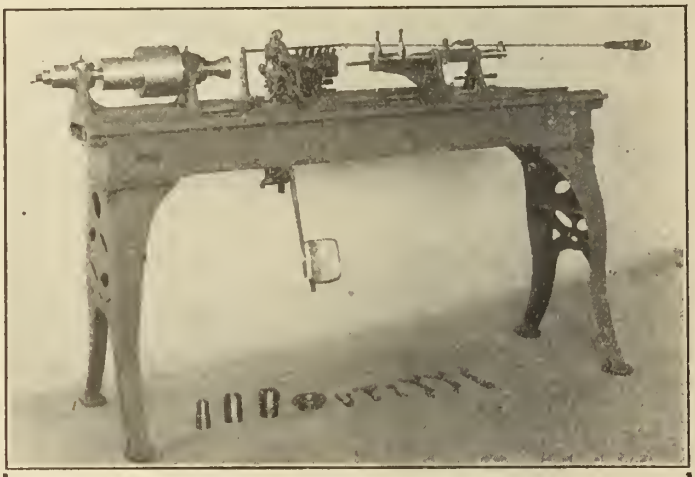
Here is a machine that will effect great savings in any plant where glued-up stock is handled.

It holds the edge glued stock securely until the glue is set. A glance at the above illustration tells the story.

ASK FOR LIST OF USERS

Nels J. Billstrom, 2002 Ninth Street, ROCKFORD, ILL.

R. S. Pollard, Preston, Ont., Canadian Sales Agent



Cut the Cost of Production

by using the

WAYMOTH VARIETY WOOD-TURNING LATHE

Every feature incorporated in the lathe which makes for a little saving in the time of the operator, every item for his convenience that enables him to do better and more rapid work, assures just that much better service to the owner.

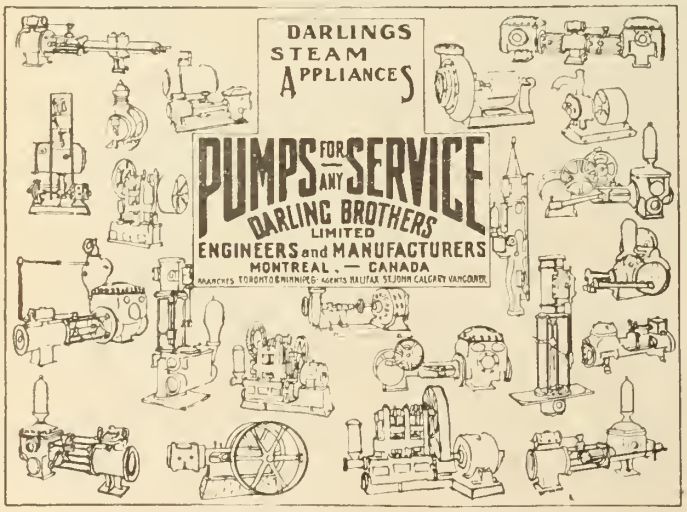
We would like to tell you about three special features of this lathe.

Our lathes are sold in Canada by

A. R. Williams Machinery Co., Toronto, Vancouver and Winnipeg
General Supply Company of Canada, Ottawa.
Williams & Wilson, Montreal.

A. D. WAYMOTH & CO., Established in 1845

Broad Street, FITCHBURG, MASS.



PRESSES

For Veneer and Veneer Drying

Made in Canada

William R. Perrin

Limited

Toronto

Eliminate Every Chance for Poor Joints on Highly-Figured End Wood Veneers by Using this Machine.

One of the largest factors in economical manufacturing lies in building the job right the first time.

In testimony thereof:

Evansville, Ind., July 12, 1916.

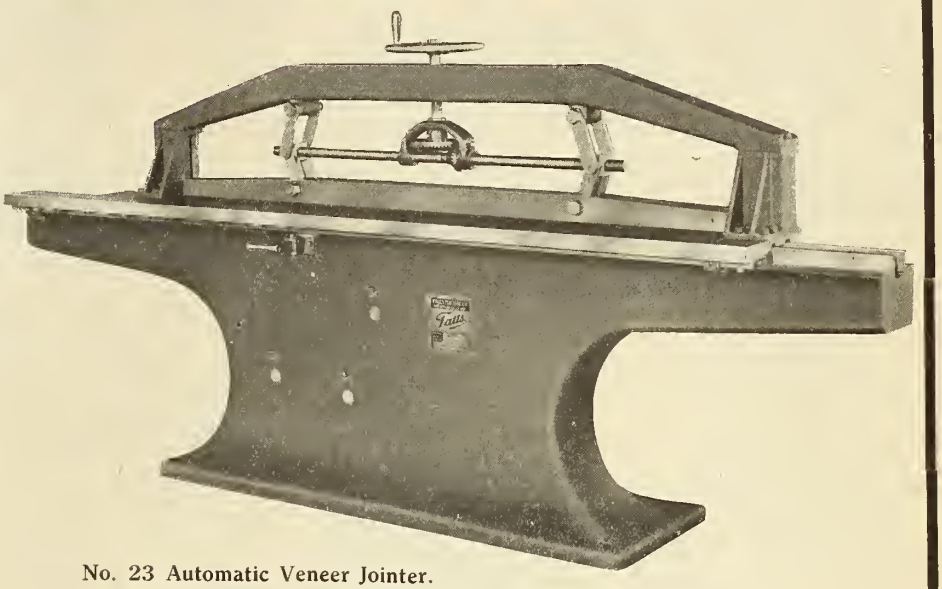
"In regard to the FALLS Veneer Jointer we are using of your make, beg to say that it is giving every satisfaction.

"We are pleased with the work that it turns out, and find that it is not only a saving in labor, but it is a saving in that the work is as it should be, which does away with having to do a part of it over. This, of course, you understand, is an item worth while.

"We are very much pleased with the machine, and cannot say that we have any trouble whatever in operating same."

Very truly yours,

THE KARGES FURNITURE CO.



No. 23 Automatic Veneer Jointer.

Falls Machine Co.

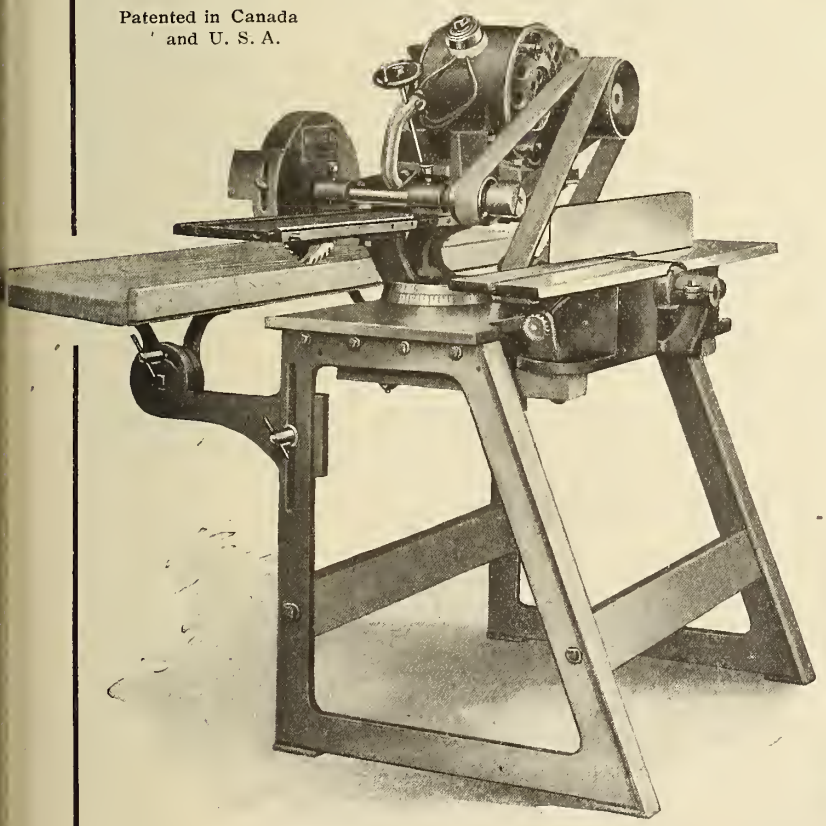
Sheboygan Falls - Wis., U.S.A.

Exclusive Canadian Representatives:

Garlock-Walker Machinery Co., Ltd.

32 Front St. West - TORONTO, CANADA

Patented in Canada and U. S. A.



Builders and Carpenters

The No. 4 Woodworker is the most complete and satisfactory woodworking machine in Canada. It combines lightness and adaptability with great strength, and always gives satisfaction.

This machine is a wonder, and will save $30.00 on every $100.00 labor cost.

It will cut and rip up to 5 inches thick and joint at the same time, do all kinds of trimming, house stair stringers, run mouldings, and, in fact, all cuts on a building.

250 of these machines have been sold in Toronto, and the same number in Detroit, besides hundreds in other cities. The United States Government has recently placed three in the Norfolk, one each in the Brooklyn and Newport News Navy Yards, and in the West Point Military Academy.

This is a fine record for a Canadian machine.

Elliot Woodworker, Limited

Corner College and Bathurst Sts., Toronto

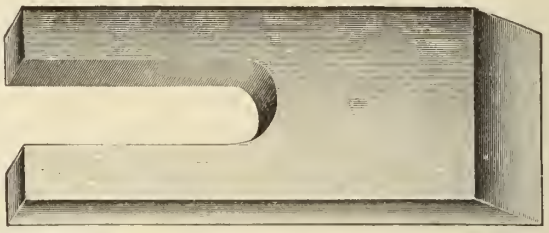
ROUGH CUT STICKER BLANKS

BEVELED and FACED STICKER BLANKS

BEVELED, FACED and TEMPERED STICKER BLANKS

All kinds of MOULDING KNIVES made to pattern

Made of a High Grade Carbon Tool Steel



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Gustafson & Scott Mfg. Co. (not Inc.)

4315-25 Wabansia Ave., Chicago, Ill.

"We are Saving over 40% of our coal!"

"I need only clean the boiler once in four weeks!"

MR. O. H. HALE, of the King Furniture Company, Warren, Ohio, is so enthusiastic about the

Morehead

Back to Boiler

SYSTEM

that he has written an account of his experiences which will profit his brother engineers everywhere.
For the Morehead "Back-to-Boiler" Book—with its many pages of data and interesting illustrations—and a complete copy of Mr. Hale's letter, just write

Canadian Morehead Mfg. Co.

WOODSTOCK Dept. "H" ONTARIO

"You never have to think about low water in the boiler!"

"I have worked other Traps but I never saw one as simple as the Morehead!"

GRAND RAPIDS

VAPOR DRY KILN

GRAND RAPIDS MICHIGAN

Increasing output of other kilns is part of our business.

We can arrange to utilize your present equipment and supplement with sufficient additional to bring your kilns to our basis of output.

We would suggest that you supply our engineering department with description of your kilns and lumber drying needs, so we can understandingly outline what can be done.

Your opening the matter will incur no obligation and we will give you, frankly, the results of our experience.

BOOKS FOR SALE

The following books are offered at special prices subject to previous sale:

Cabinet Making, by J. H. Rudd. Published by Grand Rapids Furniture Record Company. 210 pages, illustrated. Price $1.50.

Saw Fitting Manual, a treatise on the care of saws and knives. Deals with everything in the saw and knife alphabet, from adjustments to widths. 144 pages. Price $2.00.

Common-sense Handrailing, by Fred T. Hodgson. Published by Frederick J. Drake & Company, Chicago. 114 pages, illustrated. Price 50c.

Roof Framing Made Easy, by Owen B. Maginnis. Published by The Industrial Publication Company, New York. 164 pages, illustrated. Price 50c.

"Carpentry," by Ira S. Griffith. Published in 1916 by The Manual Arts Press. 188 pages, illustrated. Price $1 00.

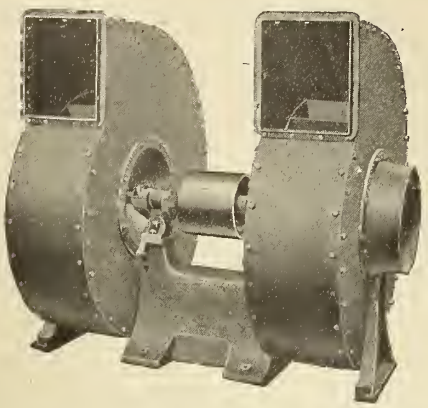
Handrailing Simplified, by An Experienced Architect. Published by William T. Comstock, New York. 52 pages, illustrated. Price 50c.

How to Join Mouldings; or, The Arts of Mitering and Coping, by Owen B. Maginnis. Published by William T. Comstock, New York. 72 pages, illustrated. Price 50c.

Utilization of Wood-Waste (Second Revised Edition), by Ernst Hubbard. Published in 1915 by Scott, Greenwood & Sons. 192 pages, illustrated. Price $1.50.

Woodworker Publishing Company, Limited

345 Adelaide Street West, Toronto, Ontario



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Slow Speed Fans are designed and built right.

They will save from 15 to 25 per cent. on your power costs.

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MINNEAPOLIS MINN., U. S. A.

The "Canadian Woodworker" Buyers' Directory

An Index to the Best Equipment and Supplies

ABRASIVES
The Carborundum Co., Niagara Falls, N.Y.

AIR BRUSH EQUIPMENT
DeVilbiss Mfg. Co., Toledo, Ohio.
Paasche Air Brush Company, Chicago, Ill.

AIR COMPRESSORS
Hamilton Motor Works, Hamilton, Ont.

ANNUNCIATORS
Signal Systems, Limited, Toronto, Ont.

BABBITT METAL
Canada Metal Company, Toronto, Ont.

BALL BEARINGS
Chapman Double Ball Bearing Co., Toronto.

BALUSTER LATHES
Garlock-Walker Machinery Co., Toronto, Ont.
Mattison Machine Works, C., Beloit, Wis.
Whitney & Son, Baxter D., Winchendon, Mass.

BAND SAW FILING MACHINERY
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Preston Woodworking Machinery Company, Preston, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

BAND SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

BAND SAW MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

BAND SAW STRETCHERS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Yates Machine Co., P. B., Hamilton, Ont.

BENDING MACHINES
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Perfection Wood Steaming Retort Company, Parkersburg, W. Va.

BELLS, ELECTRIC
Signal Systems, Limited, Toronto, Ont.

BELTING
Fay & Egan Co., J. A., Cincinnati, Ohio.
Sadler & Haworth, Montreal, Que.

BLOWERS
Canadian Blower & Forge Co., Kitchener, Ont.
Sheldons, Limited, Galt, Ont.
Toronto Blower Co., Toronto, Ont.

BLOW PIPING
Sheldons, Limited, Galt, Ont.
Toronto Blower Company.

BORING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mereen-Johnson Mach. Co., Minneapolis, Minn.
Nash, J. M., Milwaukee, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

BOX BANDS
Laidlaw Bale-Tie Co., Hamilton, Ont.

BOX MAKERS' MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mereen-Johnson Machine Company, Minneapolis, Minn.
Neilson & Company, J. L., Winnipeg, Man.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

CABINET PLANERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Hall & Brown Machinery Co., St. Louis, Mo.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

CARS (Transfer)
Sheldons, Limited, Galt, Ont.

CARBORUNDUM PAPER
Carborundum Co., Niagara Falls, N.Y.

CARVING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

CASTERS
Burns & Bassick Co., Bridgeport, Conn.
Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.
Noblit Bros. & Company, Philadelphia, Pa.
Schmidt, F. A., Kitchener, Ont.

CLAMPS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Neilson & Company, J. L., Winnipeg, Man.
Preston Woodworking Machinery Company, Preston, Ont.

COLUMN MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

CORRUGATED FASTENERS
Acme Steel Goods Company of Canada, Ltd.

CRATING LUMBER
Read Bros., Limited, Toronto.

CUSTOMS TURNINGS
Galbraith & Co., Ltd., Owen Sound, Ont.

CUT-OFF SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

CUTTER HEADS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Gage Mfg. Company, E. E., Gardner, Mass.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, Beloit, Wis.
Shimer Cutter Head Co., Galt, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

DOVETAILING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

DOWEL MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

DOWELS
Toy Products Co. of Canada, Farm Point, Que.

DRY KILNS
Grand Rapids Veneer Works, Grand Rapids, Mich.
National Dry Kiln Co., Indianapolis, Ind.
Sheldons, Limited, Galt, Ont.

DUST COLLECTORS
Sheldons, Limited, Galt, Ont.
Toronto Blower Company.

DUST SEPARATORS
Sheldons, Limited, Galt, Ont.
Toronto Blower Company.

EDGERS (Single Saw)
Canada Machinery Corporation, Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont
Radcliff Saw Mfg. Co., Toronto, Ont.

EDGERS (Gang)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Williams Machinery Co., A. R., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

END MATCHING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

EXHAUST FANS
Canadian Blower & Forge Co., Kitchener, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Sheldons Limited, Galt, Ont
Toronto Blower Company, Toronto, Ont.

FEED ATTACHMENTS
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.

FILTER OILS
Nugent & Co., Wm. W., Chicago, Ill.

FLOORING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

FLUTING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.

FLUTING AND TWIST MACHINE
Preston Woodworking Machinery Company, Preston, Ont.

FURNITURE CARVINGS
Decorators Supply Co., Chicago, Ill.

FURNITURE LEATHER
Boulee Fraser Leather Co., New York.
Eagle-Ottawa Leather Co., Grand Haven, Mich.
Schmidt, F. A., Kitchener, Ont.

FURNITURE TRIMMINGS
Burns & Bassick Co., Bridgeport, Conn.
Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.
Noblit Bros. & Company, Philadelphia, Pa.
Schmidt, F. A., Kitchener, Ont.
Weber Knapp Co., Jamestown, N.Y.

GARNET PAPER AND CLOTH
The Carborundum Co., Niagara Falls, N.Y.

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Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Yates Machine Co., P. B., Hamilton, Ont.

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in Your Factory over and over again, BUT—

HAVE YOU GOT THEM ?

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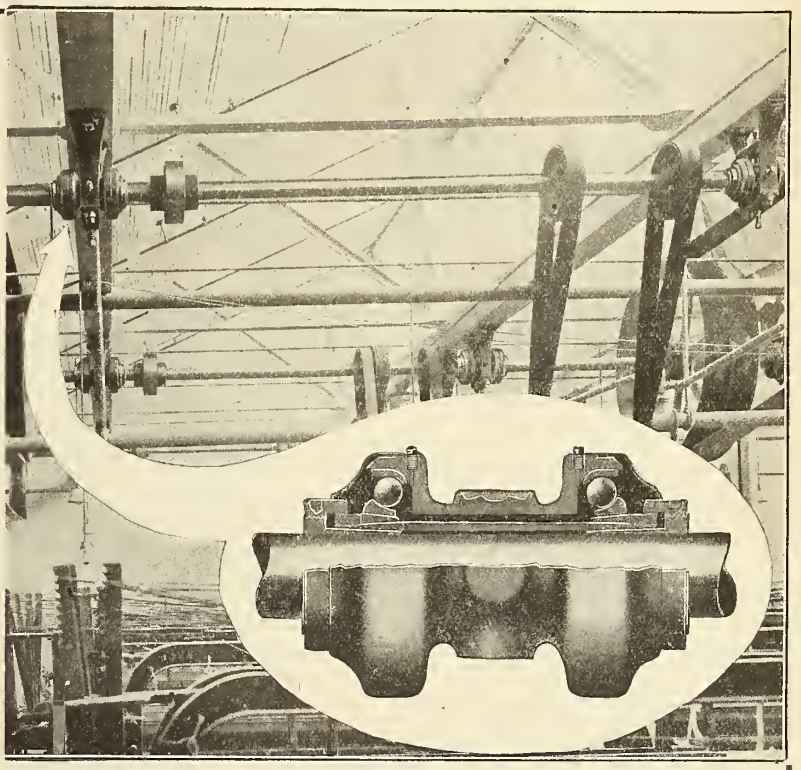


The Chapman Double Ball Bearing Co. of Canada, Limited

Toronto 339-351 Sorauren Ave. Ontario

American Branch: The Transmission Ball Bearing Co., Inc., 32 Wells St., Buffalo, N.Y.

"Canadian Woodworker" Buyers' Directory—Continued

GLUE
Perkins Glue Company, South Bend, Ind.

GLUE CLAMPS
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Neilson & Company, J. L., Winnipeg.

GLUE HEATERS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Kitchener, Ont.

GLUE JOINTERS
Canada Machinery Corporation, Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Yates Machine Co., P. B., Hamilton, Ont

GLUE SPREADERS
Fay & Egan Co., J. A., Cincinnati, Ohio
Jackson, Cochrane & Company, Kitchener, Ont.

GLUE ROOM EQUIPMENT
Billstrom, Nels. J., Rockford, Ill.
Perrin & Company, W. R., Toronto, Ont.

GRINDERS (Cutter)
Fay & Egan Co., J. A., Cincinnati, Ohio
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.

GRINDERS, HAND AND FOOT POWER
The Carborundum Co., Niagara Falls, N.Y.

GRINDERS (Knife)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Machinery Co. of America, Grand Rapids, Mich.
Petrie, H. W., Toronto.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

GRINDERS (Tool)
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Kitchener, Ont.

GRINDING WHEELS
The Carborundum Co., Niagara Falls, N.Y.

GROOVING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio
Mattison Machine Works, C., Beloit, Wis.

GUARDS
Gustafson & Scott Mfg. Co., Chicago, Ill.

GUM LUMBER
Anderson-Tully Co., Memphis, Tenn.
Brown & Co., George C., Memphis, Tenn.
Churchill-Milton Lumber Co., Louisville, Ky.
Gayoso Lumber Company, Memphis, Tenn.
Thomas & Proetz Lumber Co., St. Louis, Mo.

GUMMERS, ETC.
Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND PROTECTORS
Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND SCREWS
Fay & Egan Co., J. A., Cincinnati, Ohio.

HANDLE & SPOKE MACHINERY
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Whitney & Son, Baxter D., Winchendon, Mass.

HARDWARE
Burns & Bassick Co., Bridgeport, Conn.
Faultless Caster Co., Evansville, Ind.
Foster, Merriam & Co., Meriden, Conn.
Laidlaw Bale-Tie Co., Hamilton, Ont.
Schmidt, F. A., Kitchener, Ont.
Weber-Knapp Co., Jamestown, N.Y.

HARDWOOD LUMBER
American Hardwood Lumber Co., St. Louis, Mo.
American Oak Mfrs.' Assn., Memphis, Tenn.
Anderson-Tully Co., Memphis, Tenn.
Atlantic Lumber Company, Toronto.
Barr-Holaday Lumber Co., Greenfield, Ohio.
Bennett Lumber Co., Montreal, Que.
Brown & Company, Geo. C., Memphis, Tenn.
Bury & Company, Robert, Toronto, Ont.
Churchill-Milton Lumber Co., Louisville, Ky.
Clark & Son, Edward, Toronto, Ont.
Felger Lumber and Timber Co., Grand Rapids, Mich.
Gayoso Lumber Company, Memphis, Tenn.
Graves, Bigwood Company, Toronto, Ont.
Kersiey, Geo., Montreal, Que.
Korn-Conkling Co., Cincinnati, Ohio.
Martin-Barriss Co., Cleveland, Ohio.
McLennan Lumber Co., Montreal, Que.
Paepcke Leicht Lumber Co., Chicago, Ill.
Penrod, Jurden & McCowen, Memphis, Tenn.
Penrod Walnut & Veneer Co., Kansas City.
Pickrel Walnut Co., St. Louis, Mo.
Spencer, C. A., Montreal, Que.

HUB MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
Hydraulic Machinery Company, Montreal, Que.
Perrin & Company, Wm. R., Toronto, Ont.

INCANDESCENT LAMPS
Canadian Laco Philips Co., New York and Toronto.

JOINTERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Williams Machinery Co., A. R., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

KNIVES (Planer and others)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
E. E. Gage Mfg. Company, Gardiner, Mass.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

LATHES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Defiance Machine Works.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Foss & Hill Machinery Company, Montreal.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.

LUMBER
American Hardwood Lumber Co., St. Louis, Mo.
Anderson-Tully Co., Memphis, Tenn.
Barr-Holaday Lumber Co., Greenfield, Ohio.
Bennett Lumber Co., Montreal, Que.
Brown & Company, Geo. C., Memphis, Tenn.
Churchill, Milton Lumber Co., Louisville, Ky.
Clark & Son, Edward, Toronto, Ont.
Felger Lumber and Tmber Co., Grand Rapids, Mich.
Gayoso Lumber Company, Memphis, Tenn.
Graves, Bigwood Company, Toronto, Ont.
Hartzell, Geo. W., Piqua, Ohio.
Korn-Conkling Company, Cincinnati, Ohio.
McLennan Lumber Co., Montreal, Que.
Paepcke Leicht Lumber Company, Chicago, Ill.
Pickrel Walnut Co., St. Louis, Mo.
Shreiner Lumber Co., Pittsburgh, Pa.

MACHINE KNIVES
Canada Machinery Corporation, Galt, Ont.
E. E. Gage Mfg. Company, Gardiner, Mass.
Peter Hay Knife Company, Galt, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

MITRE MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

MITRE SAWS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.

MULTIPLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.

NITROGEN LAMPS
Canadian Laco Philips Co., New York and Toronto.

OILERS—SHAFT
Nugent & Co., Wm. W., Chicago, Ill.

OILING DEVICES
Nugent & Co., Wm. W., Chicago, Ill.

OILING SYSTEMS
Nugent & Co., Wm. W., Chicago, Ill.

PANELS
Waetjen & Co., George L., Milwaukee, Wis.

PATTERN SHOP MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PERIOD CARVINGS
Walter & Sons, J., Kitchener, Ont.

PERIOD MOULDINGS
Waddell Mfg. Co., Grand Rapids, Mich.

PLANERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Wallace & Company, Chicago, Ill.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PLANING MILL MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Foss & Hill Machinery Company, Montreal.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

PRESSES (Veneer)
Canada Machinery Corporation, Galt, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Perrin & Co., Wm. R., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.

PULLEYS
Dodge Mfg. Company, Toronto, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

RED GUM LUMBER
Gum Lumber Manufacturers' Association.

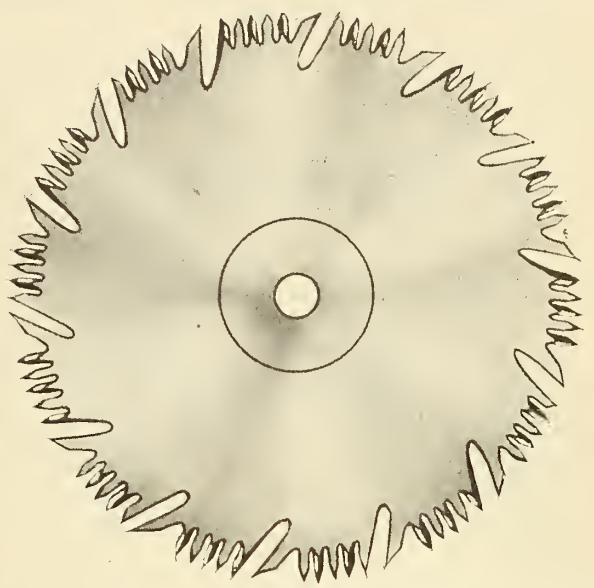
RECORDERS (TIME)
International Time Recording Co., Toronto, Ont.
Signal Systems, Limited, Toronto, Ont.

RESAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

The "Beaver" Circular Planer Saw

The Beaver Planer Saw is made by our own special process, and will cut very fast and smoothly without burning — making a clean planed or polished cut. They are already sharpened for use when sent out, and are particularly adapted to toy and shell box work, where smooth, clean cutting is necessary. The Beaver Planer Saw will cut quickly, and is used by many of our customers on lightning cut-off or jump saw rigs with perfect satisfaction.

The Beaver Planer Saw must not be confounded with the common novelty or mitre saw sold, which burns the work and cuts very slowly.



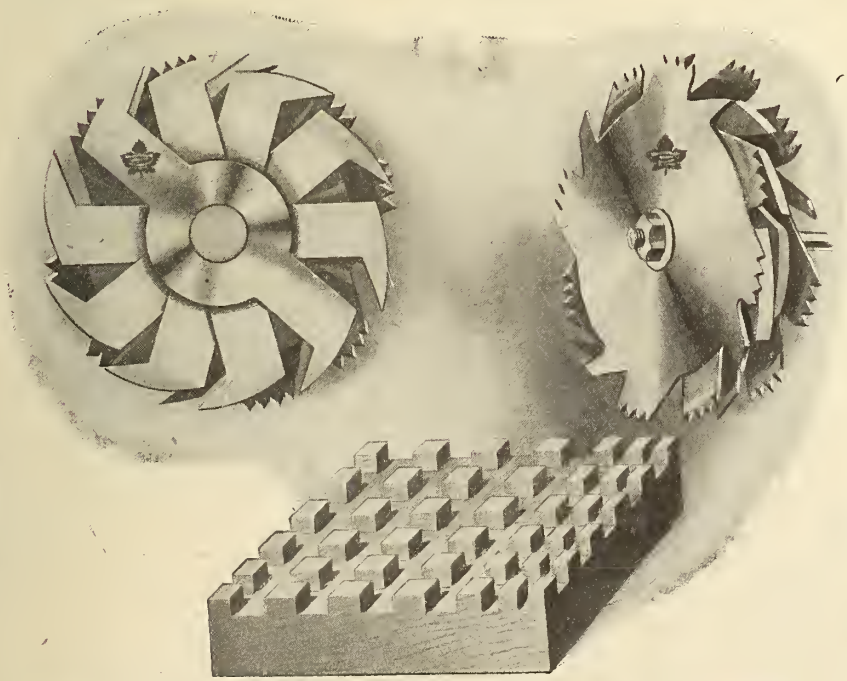
Radcliff Saw Manufacturing Co., Limited

TORONTO 550 Dundas Street ONTARIO

Agents for L. & I. J. White Company Machine Knives

It Pays to Use

"Maple Leaf" Saws



We manufacture—

Bands,

all kinds of

Special Circular Saws

for Special work,

Cross Cut Saws,
Gang Saws,
Grooving Saws,
Chamfering Saws,
Concave Saws,
etc., etc.

EVERY SAW GUARANTEED.

Write for Catalogue

Shurly-Dietrich Co., Limited

GALT - CANADA

306-308 Wellington St., Ottawa, Ont.
Vancouver, B.C.

"Canadian Woodworker" Buyers' Directory—Continued

RIM AND FELLOE MACHINERY
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.

RIP SAWING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SAFETY DEVICES
Gustafson & Scott Mfg. Co., Chicago, Ill.
Imperial Machinery Co., Grand Rapids, Mich.

SANDERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Nash, J. M., Milwaukee, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SASH, DOOR & BLIND MACHINERY
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Williams Machinery Co., A. R., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SAWS
Atkins & Co., E. C., Indianapolis, Ind.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Radcliff Saw Mfg. Company, Toronto, Ont.
Shurly-Dietrich, Ltd., Galt, Ont.
Smith Co., Ltd., R. H., St. Catharines, Ont.

SAW GUMMERS, ALOXITE
The Carborundum Co., Niagara Falls, N.Y.

SAW SWAGES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Radcliff Saw Mfg. Co., Toronto, Ont.

SAW TABLES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SCRAPING MACHINES
Canada Machinery Corporation, Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass

SCREW DRIVING MACHINERY
Canada Machinery Corporation, Galt, Ont.

SCROLL SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SECOND-HAND MACHINERY
Cowan & Co., Galt, Ont.
Petrie, H. W., Toronto, Ont.
Williams Machinery Co., A. R., Toronto, Ont.

SHAFT OILERS
Nugent & Company, Wm. W., Chicago, Ill.

SHAPERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass
Yates Machine Co., P. B., Hamilton, Ont.

SHARPENING TOOLS
The Carborundum Co., Niagara Falls, N.Y.

SHAVING COLLECTORS
Sheldons Limited, Galt, Ont.
Toronto Blower Company.

SHOOK BUNDLER
Neilson & Company, J. L. Winnipeg, Man.

SPRINGS FOR UPHOLSTERY
Foster Bros. Mfg. Co., Utica, N.Y.
Steele, James, Ltd., Guelph, Ont.

STAINS
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

STEAM APPLIANCES
Darling Bros., Montreal.

SINGLE SPINDLE BOXING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

STAVE SAWING MACHINE
Whitney & Sons, Baxter D., Winchendon, Mass

STEAM TRAPS
Canadian Morehead Mfg. Co., Woodstock, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

STEEL BOX STRAPPING
Acme Steel Goods Co. of Canada, Ltd.

STEEL SHELL BOX BANDS
Acme Steel Goods Co. of Canada, Ltd.

SURFACERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

SWING SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

TABLE LEG LATHES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Mattison Machine Works, C., Beloit, Wis.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

TABLE SLIDES
Walter & Co., B., Wabash, Ind.

TENONING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

TELEPHONES—PRIVATE SYSTEMS
Signal Systems, Limited, Toronto, Ont.

TRIMMERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

TRUCKS
Sheldons Limited, Galt, Ont.
National Dry Kiln Co., Indianapolis, Ind.

TUNGSTEN LAMPS
Canadian Laco-Philips Co., New York and Toronto.

TURNING MACHINES
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Mattison Machine Works, C., Beloit, Wis.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

UNDER-CUT SELF-FEEDING FACE PLANER
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

UPHOLSTERING SPRINGS
Steele, James, Ltd., Guelph, Ont.

VARNISHES
Ault & Wiborg Company, Toronto, Ont.

VARNISH SPRAYERS
DeVilbiss Mfg. Co., Toledo, Ohio.
Paasche Air Brush Company, Chicago, Ill.

VENEERS
Bury & Company, Robert, Toronto, Ont.
Clark Veneer Co., Walter, Grand Rapids, Mich.
Empire Veneer Company, Chicago, Ill.
Hartzell, Geo. W., Piqua, Ohio.
Hoffman Bros. Company, Fort Wayne, Ind.
Geo. Kersley, Montreal, Que.
Nartzik, J. J., Chicago, Ill.
Ohio Veneer Company, Cincinnati, Ohio.
Penrod, Jurden & McCowen, Memphis, Tenn.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Roberts Veneer Co., New Albany, Ind.
Toronto Veneer Company, Toronto, Ont.
Waetjen & Co., George L., Milwaukee, Wis.

VENEER TAPE
Ideal Coated Paper Co., Brookfield, Mass.

VENTILATING APPARATUS
Sheldons Limited, Galt, Ont.

VENEER JOINTERS
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.

VENEER PRESSES (Hand and Power)
Canada Machinery Corporation, Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Perrin & Company, Wm. R., Toronto, Ont.

VISES
Fay & Egan Co., J. A., Cincinnati, Ohio.

WAGON AND CARRIAGE MACHINERY
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass
Yates Machine Co., P. B., Hamilton, Ont.

WATCHMAN'S CLOCKS
Signal Systems, Limited, Toronto, Ont.

WOOD FINISHES
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

WOOD TURNING MACHINERY
Canada Machinery Corporation, Galt, Ont.
Defiance Machine Works, Defiance, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Waymoth & Co., A. D., Fitchburg, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

WORK BENCHES
Fay & Egan Co., J. A., Cincinnati, Ohio.

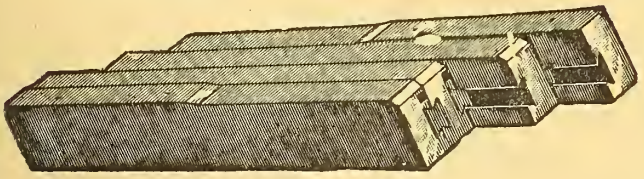
WOOD TURNINGS
Toy Products Co. of Canada, Farm Point, Que.

WOODWORKING MACHINES
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Elliot Woodworker Limited, Toronto, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Hall & Brown Machinery Co., St. Louis, Mo.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Williams Machinery Co., A. R., Toronto, Ont.

WHEELS, Grinding, Carborundum and Aloxite
The Carborundum Co., Niagara Falls, N.Y.

Making TABLE-SLIDES is a Specialty Business

For more than TWENTY-FIVE YEARS we have made TABLE SLIDES exclusively. Our Factory is equipped with Special Machinery which enables us to make SLIDES,—BETTER and CHEAPER than the furniture manufacturer.



Canadian Table makers are rapidly adopting WABASH SLIDES

Because { They ELIMINATE SLIDE TROUBLES / Are CHEAPER and BETTER

Reduced Costs / **Increased Out-put** { BY USING **WABASH SLIDES**

MADE BY

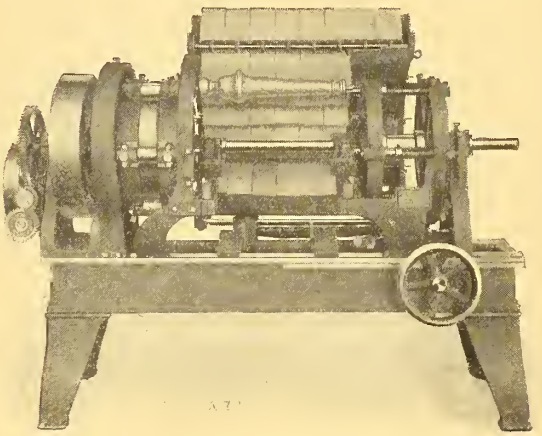
B. Walter & Company

Wabash, Ind.

The Largest EXCLUSIVE TABLE-SLIDE Manufacturers in America

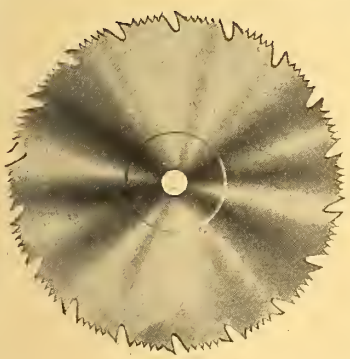
ESTABLISHED-1887

DOES THE WORK OF FIVE to FIFTEEN MEN AND DOES IT BETTER



Ask me to show you proof of this. I will gladly do so. This is an opportunity to cut down the high cost of manufacturing.

J. M. NASH, Milwaukee, Wis.



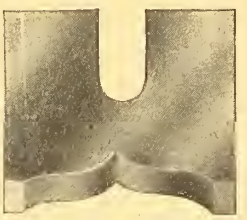
ATKINS

STERLING QUALITY

SAWS and KNIVES

The best steel—the most careful and accurate workmanship—the equipment that will eventually save you money.

Atkins Sterling Quality Saws and Knives are proving their superiority by competitive tests in the largest plants of the country. We welcome your most careful investigation, as we know the satisfaction that will result.



Write to-day for our Knife Booklet "C W" and Pattern Template Paper.

E. C. ATKINS & CO.

Makers of Sterling Saws

Factory—HAMILTON, Ont. **Vancouver Branch—109 Powell Street**

for Rubbing Varnish

THE MATTISON ELECTRIC "RUBBER"

Doubles Man's Capacity

No man can rub uniformly by hand all day long. As the day closes he loses efficiency and the finish or output must suffer. But with this little electric rubbing machine he can produce exactly the same high grade work at four o'clock in the afternoon as he did at nine in the morning. There is no hard labor connected with operating it—all that is necessary is for the operator to guide it over the surface.

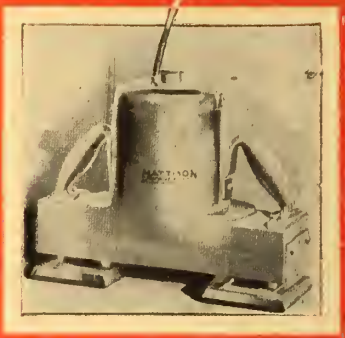
The machine requires no hose, piping, or any special equipment. All you have to do is to attach it to a light socket, turn the switch and go ahead. When idle, it costs nothing for operation or up-keep; and when running, consumes about as much current as three or four incandescent lamps. By doing two men's work every day, it practically pays for itself every three to six months.

If you are interested, why not let us send you our large descriptive circular on this machine?

C. Mattison Machine Works
883 Fifth St., Beloit, Wisconsin

– operates direct from Lamp Socket

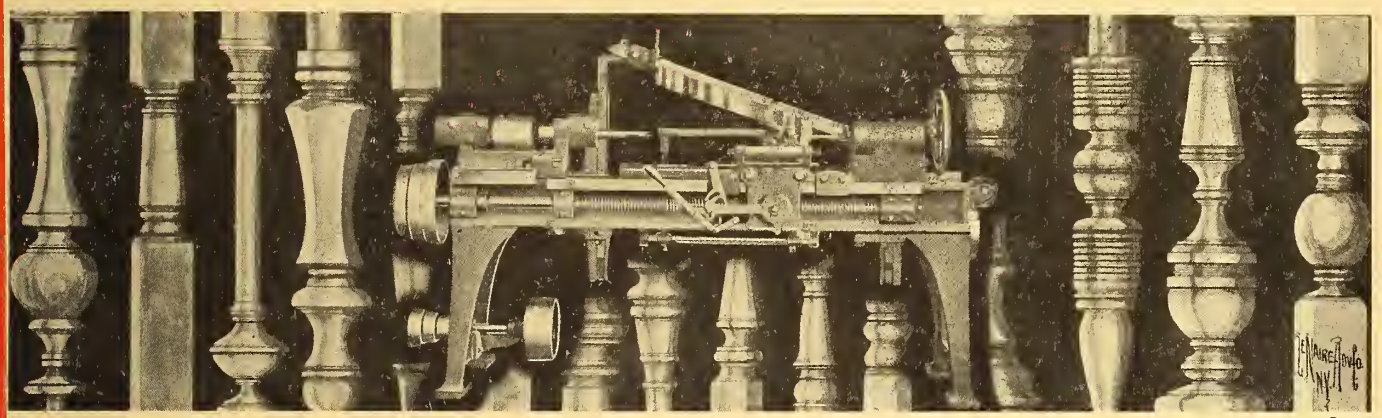
MATTISON ELECTRIC RUBBING MACHINE



Volume Seventeen TORONTO, DECEMBER, 1917 Number Twelve

CANADIAN WOODWORKER and Furniture Manufacturer

Where You Profit Most



Whether you make duplicate turnings as a specialty or to utilize waste—the proper gauge lathe insures success

A Whitney Back-Knife Gauge Lathe

has a big working capacity—its speed means dollars earned—its accuracy means perfect reproductions of the back-knife pattern—the variety of turnings possible depends only upon the number of knives with which your Whitney Gauge Lathe is equipped.

The test of a gauge lathe is not on a few mechanical devices alone—but the machine's **complete adaptability to your work.**

We make the Whitney in four different sizes—20, 30, 40 and 50 inch. They turn stock up to 3 inches square.

The guiding of tools is done mechanically. The head and tail spindles are made of cast steel. Bearings are oil-flooded but oil cannot work out of boxes. The head center, instead of the tail center, is moved to clamp the work, which saves stock.

A quick way to find out how much you need this profitable Whitney Gauge Lathe is to send today to our nearest office for booklet.

Baxter D. Whitney & Son, Winchendon, Mass.

H. H. Plummer & Co.
451-453 Monadnock Bldg.
San Francisco, Cal.

Canadian Representatives:
H. W. Petrie, Limited
Toronto, Ontario

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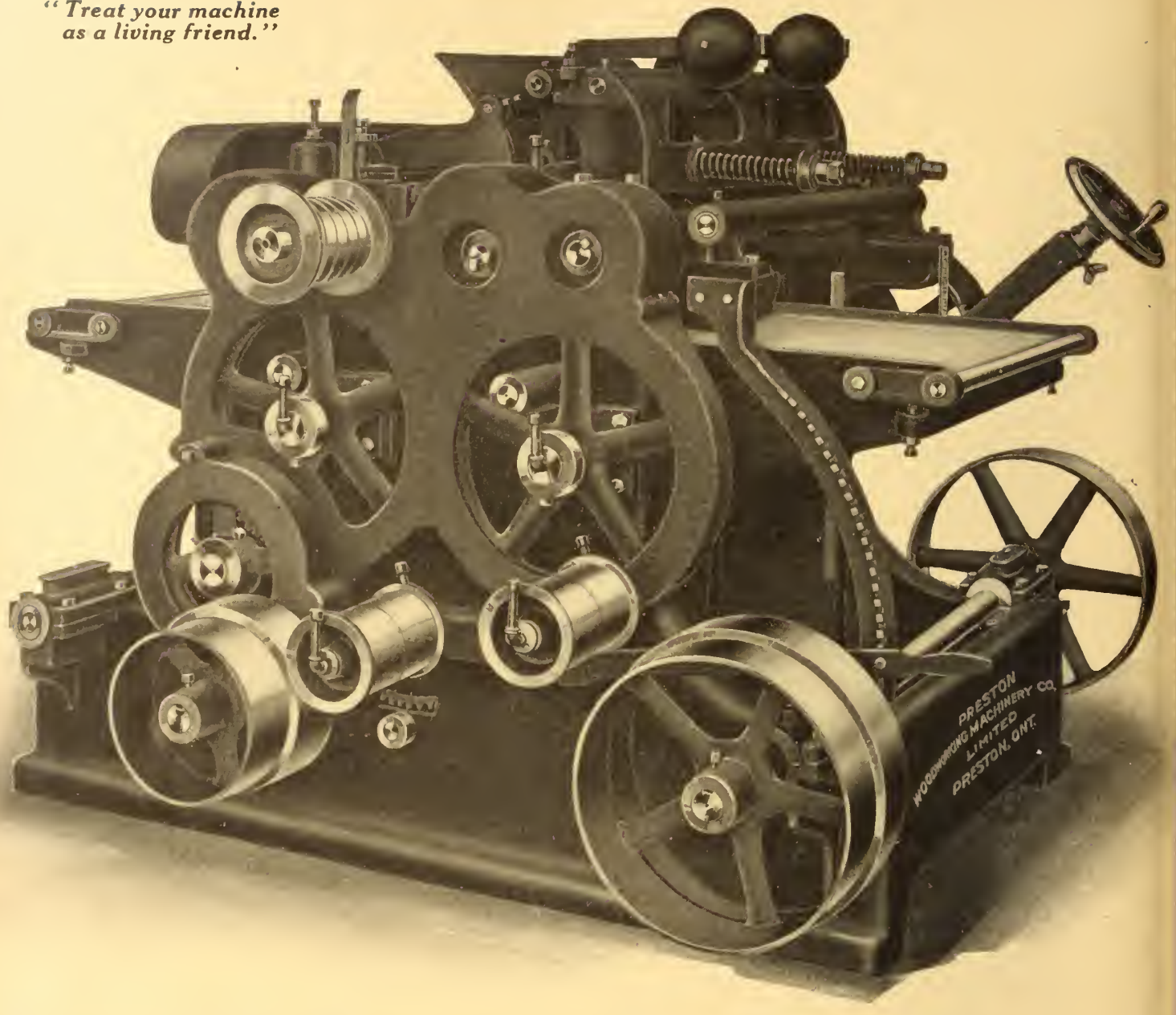
"Treat your machine as a living friend."



No. 123 Preston Surface Planer

With Divided or Straight Roll. Planes 26 ins. and 30 ins. wide, 10 ins. thick.
Long Whitney Boxes. All Gears Protected.
All Feed Rolls driven by large powerful Gears.
Special attention to Lubrication. Substantial Floor Bearing.

DURABILITY — CONVENIENCE — WEIGHT — SPEED

Ask us for circular of this machine. It is a strongly built, heavy machine, and we commend it to Shipbuilders and any Woodworkers as being ABLE TO GO THE LIMIT and produce BEST AND SMOOTHEST RESULTS.

We recently shipped a 30 in. machine to the Department of Naval Service at Halifax, and it is giving good satisfaction.

WRITE FOR CATALOGUE

The Preston Woodworking Machinery Co., Limited

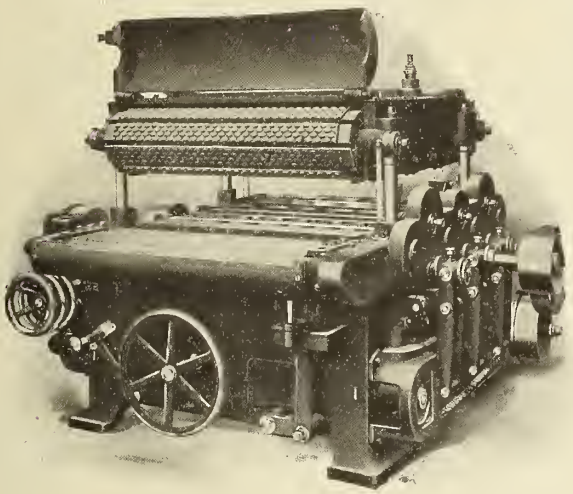
PRESTON, ONTARIO

GARLOCK-WALKER MACHINERY CO. LIMITED

32 FRONT ST. WEST, TORONTO TELEPHONE MAIN 5346

TWO MACHINES IN ONE

American Combination Endless Bed and Roll Feed Sander



Equally efficient in handling long or short stock

A Practical Machine for the work in which the Roll Feed Sander excelled, as well as the light work for which the Endless Bed Machine was originally designed.

Has many times the capacity of a Roll Feed Machine and also does finer quality of work, due to the difference in the feeding mechanism (an exclusive feature).

Write for full particulars to

Garlock-Walker Machinery Co., Limited

32-34 Front Street West, Toronto, Canada

Canadian Representatives for—

THE AMERICAN WOOD WORKING MACHINERY COMPANY, ROCHESTER, N. Y.
THE M. L. ANDREWS COMPANY, CINCINNATI, O.
FALLS MACHINE COMPANY, SHEBOYGAN FALLS, WIS.
ETC., ETC.

METAL and WOODWORKING MACHINERY of all Kinds

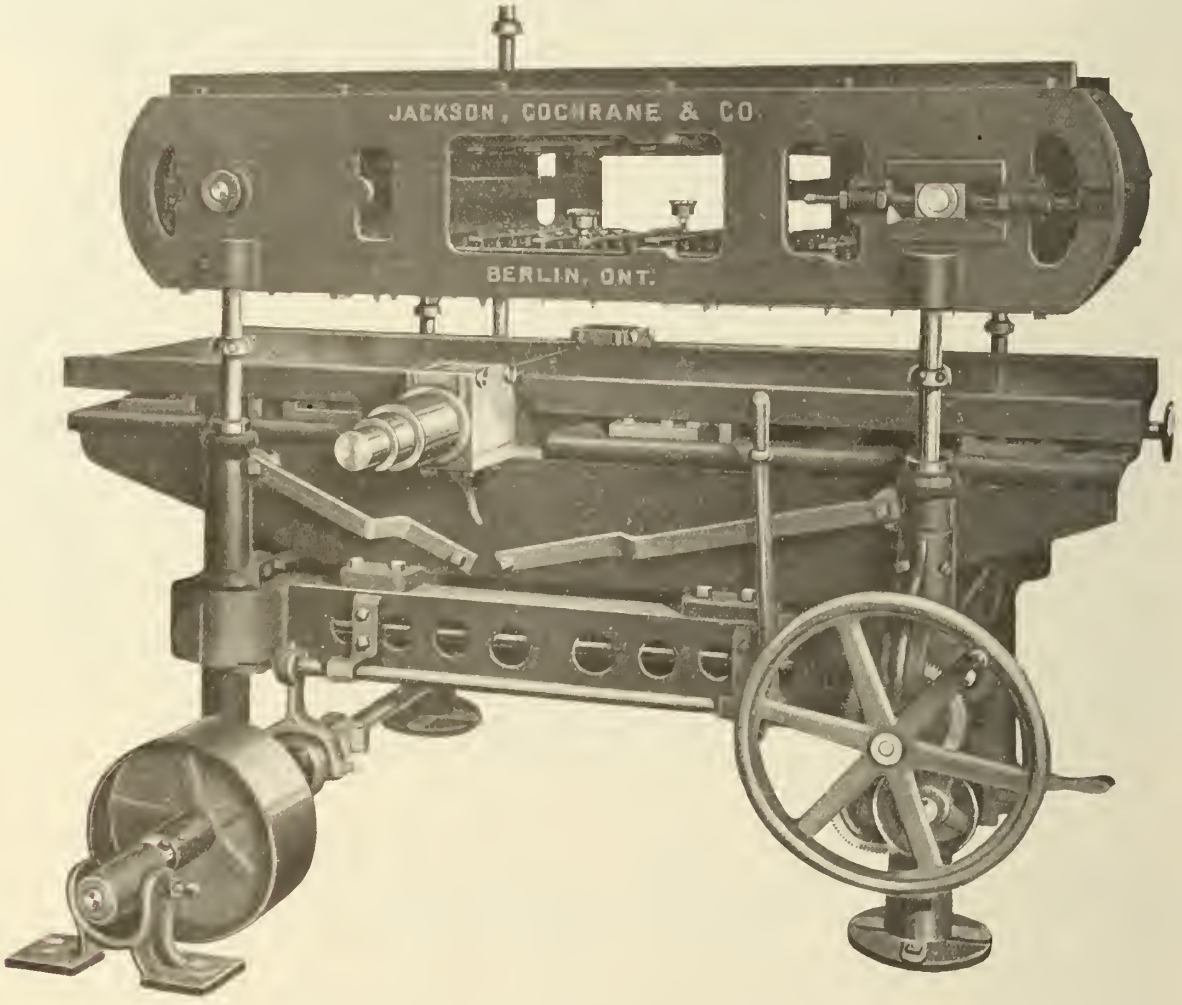
The

Herzog Self-Feed Jointer

means

Increased Production — Simplicity of Operation
Small Floor Space — Safety to Employees

Does Four Times the Work of the Hand Jointer



Our No. 34 Herzog Jointer, illustrated above, is one of the most efficient machines on the market to-day. It is appreciated by the manufacturer and employees alike, because, while it will produce from three to five times as much work as the hand jointer, it does not require skilled operators, but eliminates the danger so common to other makes. It can be operated by two boys. It will handle stock varying in width from 1 inch to the full width of the jointer, will feed fast or slow, takes only one-fourth the floor space of hand jointers, and requires only one-fifth of the sharpening of the knives. It is fitted with power feed raising and lowering attachment, with cylinder double belted and driven from both ends.

If interested in reducing your costs, write us.

Jackson, Cochrane & Company

KITCHENER - CANADA

It's "Making Good"

Everywhere, all over the country, the Yates Type G-2 Edging and Ripping Saw is making good in the plants of its owners. Although a comparatively new machine, its many superior features have gained for it wide attention and scores of installations. "The proof of a pudding is in the eating"—and, judged by that standard—the standard of use—

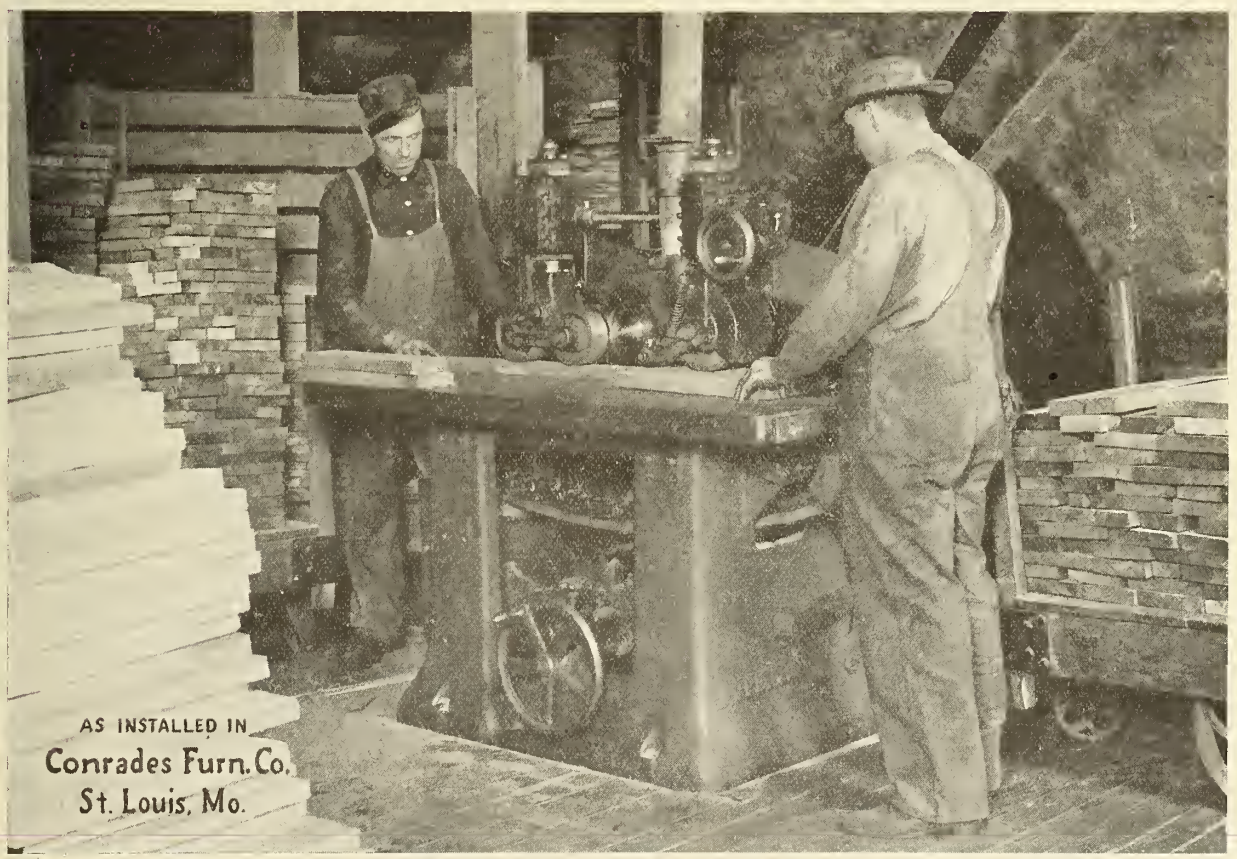
The Yates Type G-2 Edging and Ripping Saw

is a mighty satisfactory machine. Some concerns have bought a second and third.

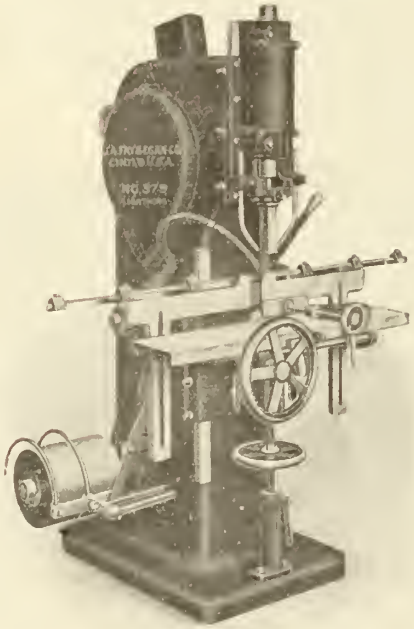
In several respects this saw is different from others of its class. We think that's why it's a better saw. There are good reasons for these differences, and the construction details are, of necessity, different also.

We would be glad to help you to investigate these reasons and details. Send for our free circular, "Type G-2"—read it—then you'll know—and you'll understand why the Yates Type G-2 is the "Invariable Choice of the Man Who Knows."

P. B. Yates Machine Company Ltd.
HAMILTON, ONT. CANADA
U.S. Plant: Beloit, Wisconsin.



Side View



Front View Plain Table.

—A New Automatic Hollow Chisel Mortiser

FAY-EGAN LIGHTNING No. 379

—carries chisels up to 1 ½" square.

—stroke adjustable from 0 to 5".

—four speeds to chisel ram.

—micrometer set for chisels and augers so you won't break chisels.

—self-contained blower for removing chips.

—all mechanism enclosed.

—bronze bearings.

—plain, compound, or universal table.

—everything you hoped some day to find in your ideal of a mortiser.

Write for Bulletin J-26.

J. A. FAY & EGAN CO.

153-173 W. Front Street CINCINNATI, OHIO

The "Shimer Limited" Expansion Head

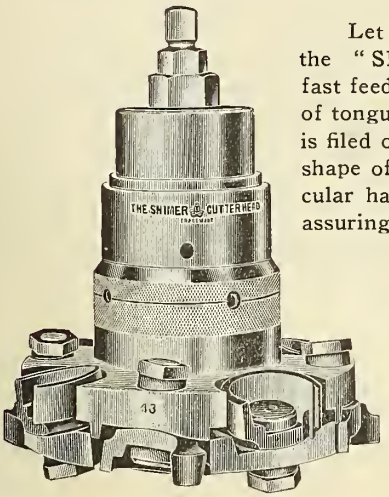


Fig. 627

Let us draw your attention to the advantages of using the "SHIMER CUTTER HEAD" for general Mill and fast feed Planer work. The Cutter is turned to cut the shape of tongue and groove desired, so that to sharpen the cutter it is filed or ground on its face, guaranteeing the user the same shape of cut during the life of the cutter. The bit being circular has from 3½ in. to 5 in. cutting length to the cutter, assuring long wearing life to the cutters.

Note that the cutter, being fastened to a concave seat on a compound angle, assures the user of the proper clearance of cutters, consequently they never burn.

These heads are fitted with or without the Self-Centering Sleeve, and made Expansion or Solid, to suit the customer's wishes.

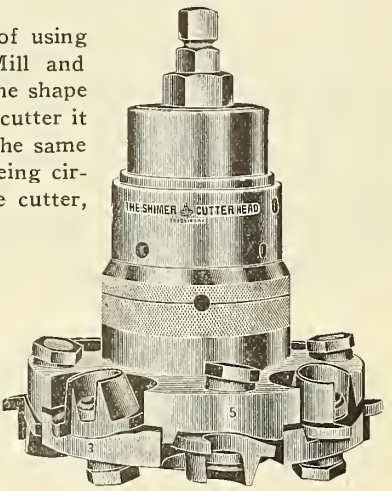


Fig. 268

Shimer Heads have been in use for sixty years, and their reliability and reputation have spoken for them in the past. Let us know your wants and we will guarantee their reliability at the present.

SHIMER CUTTER HEAD CO. OF CANADA, LIMITED

Successors to Samuel J. Shimer & Sons, Inc.

GALT, ONTARIO

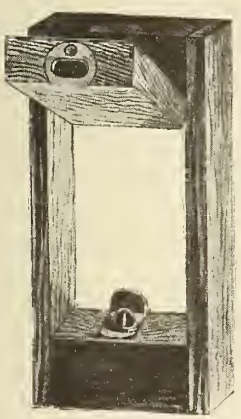
Pulls Knobs Escutcheons Toilet Hinges Commode Buttons Hooks Arm and Panholders Pans Desk Slides Casters

Screws Nails Brads Chair Rods and Bolts. Hanger Bolts Lag Screws

Tacks Twine Webbing Upholsterers Nails and Tools Tow Burlap Glue

The CATCH holds the Stop

One Operation—No Screws
No Rabbet



Just the thing for DOORS or TRIPLE MIRRORS

Invented by

NOBLIT BROS. & CO., Inc.

Established 1849 — Incorporated 1917

Write for samples and price. **Philadelphia, Pa., U.S.A.**

Locks Keys Jack Chain Shelf Supports Springs Staples Sand Paper and Cloth Seats Benches Clamps Dowels

LACO NITRO LAMPS COST LESS

Why Do You Buy Lamps?

To give money to a lamp manufacturer—to consume current or to actually get light?

The following tabulation of actual laboratory tests proves that cheap bulbs are expensive even if given to you free of charge:

NAME OF LAMP	WATTAGE AND CANDLE POWER CLAIMED FOR TESTED LAMPS	ACTUAL CANDLE POWER OF TESTED LAMPS	ACTUAL WATTAGE OF TEST LAMPS	COST 1000 C. P. LIGHT FOR 1000 HRS. AVERAGE COST CURRENT 2½¢ PER K.W.HR.			1000 HOUR LOSS
				LAMPS NEEDED	TOTAL WATTS USED	1000 HR. COST	
LACO NITRO	100	111.5	104	9	936	$23.40	NONE
COMPETING LAMP "A"	100	78.5	101	13	1313	32.83	$ 9.43
" " B	100	87.5	109.5	12	1314	32.85	9.45
" " C	100	66.9	103	15	1545	38.63	15.23
" " D	100	63.0	100	16	1600.	40.00	16.60

A SAVING OF 30% TO 50% IN CURRENT

Consumed during 1000 hours by using Laco Nitro Lamps.

Without cost to you, our nearest office will have official laboratory tests made of any of your lamps to prove our claims.

Stocks and Warehouses at

MONTREAL TORONTO WINNIPEG VANCOUVER

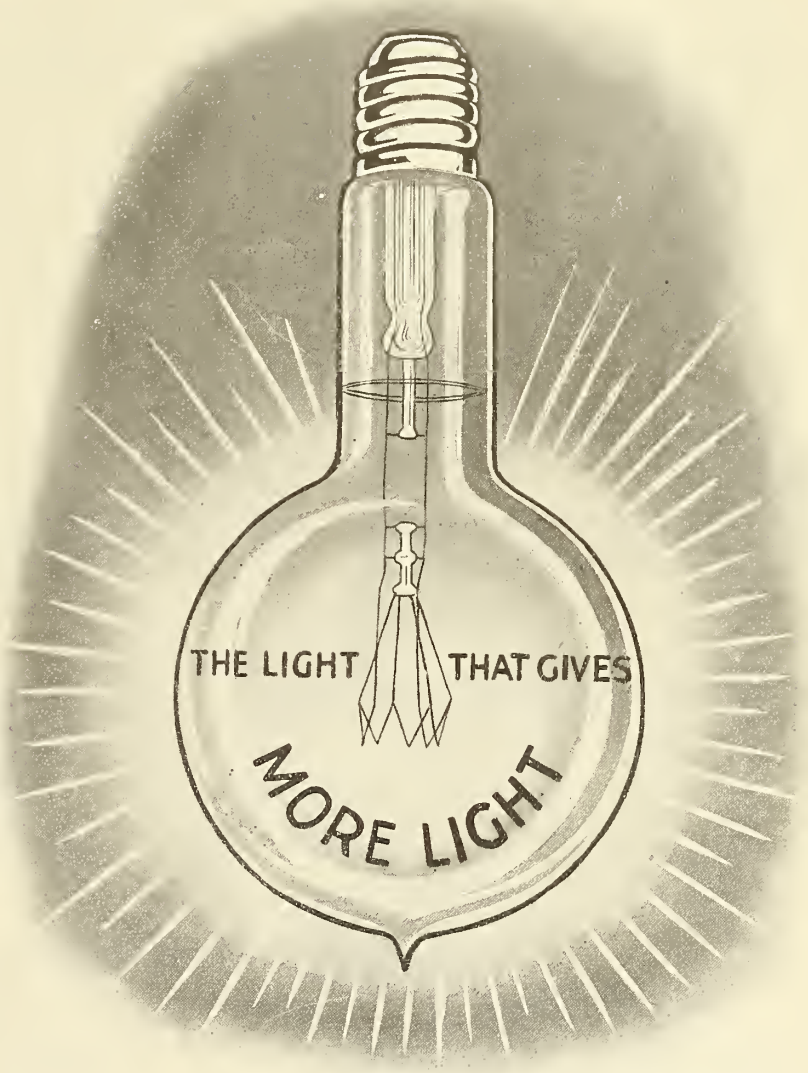
CANADIAN LACO-PHILIPS COMPANY, LTD.

"The Light That Gives MORE LIGHT"

Actual Cost
Computed from Table

Cost of 13 competitive Lamps (assumed low average cost of $1.00 each)	$13.00
Cost of current to produce 1000 candle power for 1000 hours (average)	$36.08
	$49.08
Cost of 9 Laco Nitro Lamps at maximum cost of $1.65 each . . .	$14.85
Cost of current to produce 1000 candle power for 1000 hours . . .	$23.40
	$38.25

Saving . . . $10.83



Laco Nitro Lamps Are Guaranteed

60 watt size . . . . . 700 hours
100 to 1000 Watt size 1000 hours

and many users get two or three times this service.

Can you afford to buy cheap lamps when Standard Laco Nitro Lamps effect such savings?

Ask your Dealer today about these lamps.

CANADIAN LACO-PHILIPS COMPANY, LTD.

Stocks Available at

MONTREAL TORONTO WINNIPEG VANCOUVER

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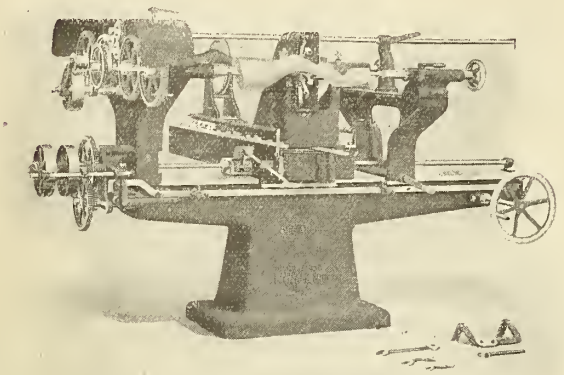

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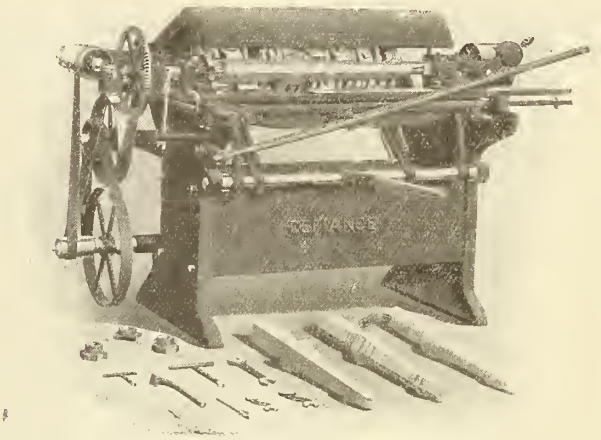

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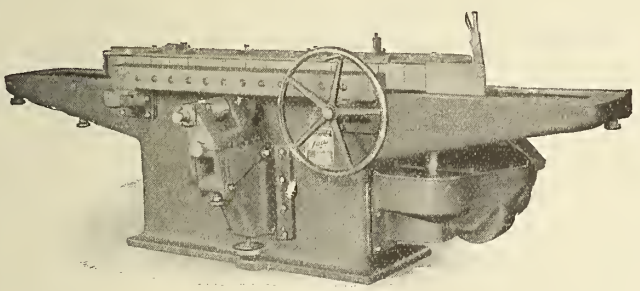

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"AMERICA'S FINEST CABINET WOOD"

The really successful merchant, it matters not in what line, is he who takes the trouble to ascertain

WHAT THE PUBLIC WANTS

This is especially true in its application to the furniture manufacturer and his retailer. He *has to* study his public—or he soon will have no public.

That portion of his public which is influenced by the principles of good taste wants RED GUM furniture—Why? Because the color, grain and soft, velvety quality of this, the finest of America's cabinet woods, when handled by a master cabinet-maker, results in a thoroughly charming piece of furniture—the kind that people of nice discrimination like to have around—and want strongly enough to *ask for*. Then can YOU supply it?

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OUR PRICE ON YOUR ORDER WILL BE FAIR

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"We have been using exclusively gum lumber, both sap and red, shipped by you for the last three years, and have been well pleased with its character, both as to grade and condition. The condition of same being an evidence of careful handling before shipping. We have been well pleased with the transactions which we have had with you, and will endeavor to continue using your stock as long as available."

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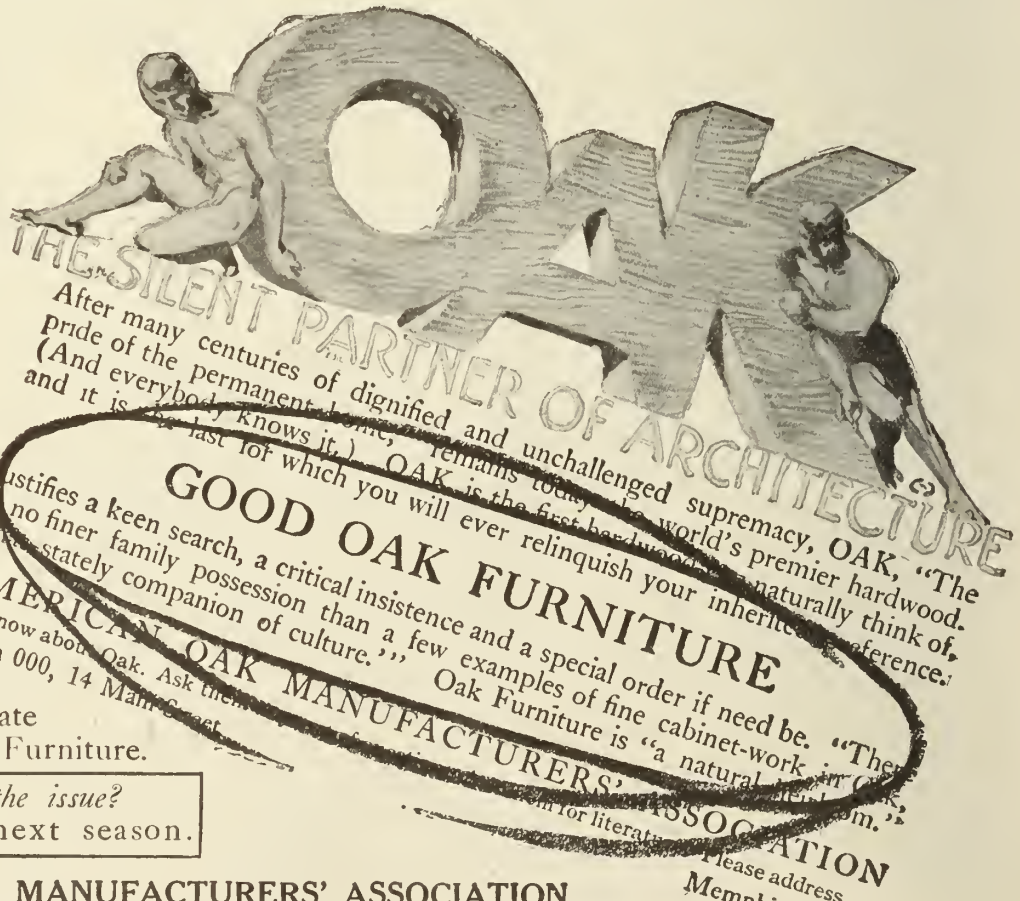
THIS MONTH the advertisement shown here is given a circulation of 2,125,000 in the highest class magazines in America. You know, of course, that continued use of this sort of advertising will greatly stimulate demand for *Good* OAK Furniture.

Does your line meet the issue?
If not, it can by next season.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THE SILENT PARTNER OF ARCHITECTURE
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pride of the permanent home, remains today the world's premier hardwood.
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is no finer family possession than a few examples of fine cabinet-work in Oak,
that stately companion of culture." Oak Furniture is "a natural choice for room."
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"All that the Word Implies"

We have endeavored to build up an organization which will insure service to our customers, and will make the term, used in connection with the business of Penrod, Jurden & McCowen, really significant. This is our idea of

"P J M SERVICE"

Scientific Drying **Expert Manufacturing**
Good Timber **Modern Mills**
Satisfaction to the Buyer

Southern Rotary Veneers and Hardwood Lumber

We can take care of your requirements in Southern woods, no matter whether you are in the market for veneers or lumber. Our big Rotary Veneer Mill at Helena, Ark., has exceptionally large units, and can readily supply sizes which are ordinarily difficult to produce. Our lumber mills are cutting some of the finest hardwood stock ever manufactured in America. Tell us what you want—we can supply you.

On account of car shortage, which affects delivery of logs to the mills as well as shipments of veneer—we urge all buyers of veneers to place requirements at least 60 to 90 days in advance.

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Penrod, Jurden & McCowen

(Incorporated)

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P J M

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Send for a line of samples and see for yourself—give it the "once over" before the January rush.

Ante bellum **prices till the end of the year. Order NOW.**

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FIRSTS AND SECONDS

40 M Ft. 4/4 F.A.S. 6 ft. and 7 ft. lengths—6 in. and wider
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52 M Ft. 4/4 4 in. and wider, 6 ft. and longer
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On Account of shipping difficulties you should not delay in placing your orders at once, so as to allow more time for shipping than in former years

Also Figured Walnut Veneers and Squares

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Elm
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Qtd. Red, Sap No Defect
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Quartered and Plain White Oak Red Oak

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Tennessee Scented Red Cedar

High Grades—Quick Shipments

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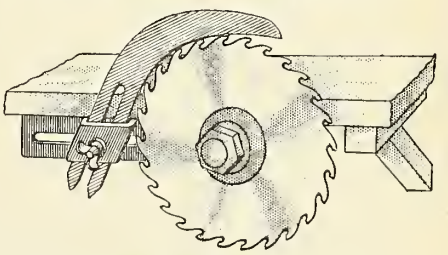
The CHEAPEST and SIMPLEST
SPLITTER SAW GUARD
Does the work for saws of any diameter



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Dry Spruce and Birch

Good Stocks, Prompt Shipments, Satisfaction

C. A. SPENCER, Limited

Wholesale Dealers in Rough and Dressed Lumber

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"Gum of Quality"

Yazoo River Red Gum

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is carefully manufactured; soft in texture; dark, rich in color; and admirably suited for furniture and interior trim.

Mills—Belzoni, Miss.; Catchings, Miss.; Naples, La.

If you are not buying from us, write today.

American Hardwood Lumber Co.

St. Louis, Mo.

Large stock of—

Dry Ash, Quartered Oak Plain Oak and Gum

Shipments from — NASHVILLE, Tenn., NEW ORLEANS, La., and BENTON, Ark.

Red Gum

Quartered or Plain Sawn

Thick or Thin

This Has Been Our Specialty for Twenty Years

Red and White Oak

Quartered or Plain

All Thicknesses

Mills:

Percy, Greenwood and Ruleville, Mississippi

Head Offices—CINCINNATI, OHIO

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KORN-CONKLING CO.

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Let us supply you with these wires, with looped ends, bent to fit the box, ready for nailing, with staples included.

Our equipment will enable us to supply you any quantity on short notice. Perfect quality. All alike

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Wire and Wire Products

Bale ties, Heading ties, Lath ties, Hardwood Flooring ties, Wire Nails, Flat Steel or Wire Barrel hoops. All sizes of Fine wire in Bright, Tinned or Galvanized, manufactured to order.

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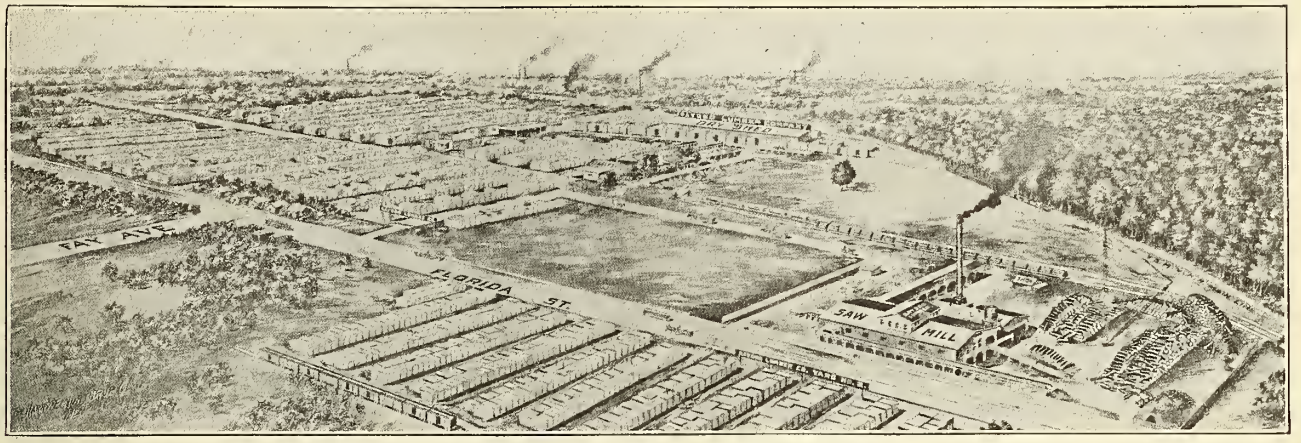
Head Office and Works: **Hamilton, Canada**



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"Direct from Producer to Consumer"

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3/4 in. 3,000 ft. Com. and Btr.
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5/4 in. 75,000 ft.
6/4 in. 60,000 ft.
8/4 in. 59,000 ft.
10/4 in. 30,000 ft. Com. and Btr.
12/4 in. 200,000 ft. Com. and Btr.
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6/4 in. 100,000 ft.
8/4 in. 3,000 ft.
4/4 in. 12,000 ft. No. 2 Com.
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Qrtd. Red Oak

4/4 in. 20,000 ft. FAS.
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12/4 in. 50,000 ft.
8/4 in. 48,000 ft. Mill Cull

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5/4 in. 1,000 ft.
6/4 in. 50,000 ft.
8/4 in. 56,000 ft.
10/4 in. 15,000 ft. Com. and Btr.
12/4 in. 14,000 ft. Com. and Btr.

Qrtd. White Oak

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5/4 in. 60,000 ft.
6/4 in. 39,000 ft.
8/4 in. 10,000 ft.

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4/4 in. 30,000 ft. No. 1 Com.
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8/4 in. 95,000 ft.

Qrtd. White Oak

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5/4 in. 40,000 ft.
6/4 in. 44,000 ft.
8/4 in. 15,000 ft.

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121,000 ft. No. 1 Com.
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110,000 ft. No. 1 Com.
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3/4 in. 115,000 ft. No. 1 Com.
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6/4 in. 280,000 ft. Com. and Btr.
8/4 in. 47,000 ft. Com. and Btr.

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10/4 in. 150,000 ft. Com. and Btr.
12/4 in. 100,000 ft. Com. and Btr.

Ash

6/4 in. 15,000 ft. No. 1 Com.

We are running both our mills, regularly, producing, in addition to the above, stock not listed herein.

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GAYOSO LUMBER COMPANY

MEMPHIS, TENNESSEE

Red Gum

America's finest cabinet wood

Red Gum, properly dried and skillfully worked up into high grade furniture, will give results unexcelled by any cabinet wood that grows. The natural finish of Gum is beautiful in itself, while this versatile wood can readily be colored to produce the effects of other cabinet woods.

We specialize in the production of perfectly dried Red Gum for use in the manufacture of high grade furniture.

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LIMITED

Hardwoods and Veneers

LUMBER

Mahogany (250,000 ft in stock, all kinds)
Walnut
Qtd. White Oak
Plain Red Oak
Poplar
Gum
And all U. S. A. Hardwoods

Birch
Basswood
Maple
Beech
Elm
Ash
And all other Canadian Hardwoods.

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SAWN

Qtd. White Oak
Qtd. Red Oak
Plain Oak
Mahogany (all kinds)
English Oak
Teak. Ash Cherry
Vermillion Birch
Poplar

ROTARY CUT

Birch, Poplar, Ash, Gum, Walnut, Basswood, Maple

SLICED

Mahogany, Walnut, Figured Gum

We also Specialize in

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Lumber Yard and Mill
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Canadian Woodworker

**A Monthly Publication in the Interest of the Woodworking Industry.
Reaches the factories producing interior finish, doors, sash, flooring, woodenware, furniture, pianos, boxes, and general mill products.**

Subscription, $1.00 a year; foreign $1.50.

Woodworker Publishing Company, Limited

Branches: Montreal, Vancouver, Chicago, New York, London, Eng.

345 Adelaide St. West, Toronto
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Vol. 17 **December, 1917** **No. 12**

Review of Trade Conditions

From the standpoint of the furniture and woodworking industry the year just closing has been, considering all the elements involved, satisfactory. Particularly is this true of the furniture factories. All through the year they have been working to almost their full capacity. A number of the plants are now working overtime to get out their orders for Christmas and those that are not working overtime report that they are busy.

The general woodworking plants, those making interior finish, sash, doors and fittings for buildings, have not been quite so fortunate. Some of them have been able to keep their plants running on shell boxes, but this business has proven most unsatisfactory during recent months owing to what seems to be the policy of the Imperial Munitions Board to grind manufacturers down to the last cent, irrespective of whether they sink or swim.

Despite the difficulties that manufacturers have faced during the past three years and a half we find them looking forward to 1918 with an optimism that speaks volumes. Elsewhere in this issue is published a letter from a Canadian furniture manufacturer that reflects the general attitude of Canadian business men. They realize the war must be won and whatever troubles crop up they make no complaints. Furniture manufacturers and woodworkers have given their best employees and in very many cases their own sons to win the war. They realize, therefore, that if they are to be worthy of those who have gone they must "carry on" at home.

Greetings!

To our readers we extend Christmas Greetings. Our sincere hope is for your happiness and prosperity throughout the New Year.

The manager of one Canadian furniture factory that the writer visited recently, when conscription was mentioned, stated that three of his sons had already enlisted voluntarily. His only remaining son was eligible under the Military Service Act and the father himself was in the trying position of being on the tribunal that was to judge whether his son should go or stay. The father's own words were: "If the boy has to go it will kill his mother, but I have no authority to exempt him." Yet he had no resentment against the position he was placed in. He was ready to give even to the last of his flesh and blood.

The business outlook for 1918 is discussed elsewhere in this issue. Letters are published from manufacturers in the different provinces. Each looks on the bright side and anticipates that conditions will be as favorable as they have been during 1917. The bugbear of increased costs may become even a little more troublesome than it has been, but manufacturers will just have to keep a close watch on their costs and increase their selling prices to keep up with them.

Taking Canada as an Example

The following pleasing reference to Canada's activities in the furniture industry during war time and to the part she has played in the war are published as an editorial in a recent issue of our contemporary, the American Furniture Manufacturer:

How Canadian furniture manufacturers have successfully "carried on" during three years of war is succinctly told by some facts and figures published in the recent annual Furniture Production Number of the Canadian Woodworker. Our Northern neighbor summarizes the situation thus: "The furniture industry in Canada is in a healthy condition. Factories in all parts of the country are turning out a steady volume of work. Retailers report that they are not anticipating any falling off in buying. In fact, as the Christmas season approaches they are making preparations to handle an increased volume of business. They are generally keeping up their advertising and showing attractive window displays; keeping up the people's interest generally in furniture." Brave words these, and encouraging, coming as they do from a country of which it is said that the point has already been reached where no able-bodied man of "war age" will allow himself to be seen walking the streets without a uniform.

The outstanding feature of the manufacturing end of the furniture business in Canada has been the shortage of help, first of all, and the partial circumvention of this difficulty by equipping plants with all the labor-saving devices possible. Female labor, too, has been introduced into Canadian woodworking plants with considerable success. Particularly in the finishing room have labor-saving devices been introduced to

good advantage. Altogether the situation as regards labor is at present considered very satisfactory.

It is significant, also, in looking over the review of Canada's progress in woodworking during the past year or so, to note that the largest sales of furniture have been of the medium grades, consisting of modified reproductions of period styles. However, in addition to producing the medium grades, many manufacturers are turning out almost as many of the high grades as formerly.

The above gives a bird's-eye view of what Canada has accomplished in the way of furniture manufacture since the war began. Of course, Canada's example cannot be made to fit the case of America exactly. It is probable, and it is to be hoped that this country will not have to face all the difficulties and problems that have confronted its Northern neighbor in the past three years. The point is that if Canada, with not near the resources of the United States, has been able to accomplish so much in the face of such great trial, this should certainly lift some anticipatory worry from the shoulders of American manufacturers and encourage them to go ahead with their slogan, "Business as Usual."

Articles in American periodicals and conversations with Americans lead us to believe that the part Canada has played in the war has placed us high in the esteem of our neighbors to the south. Canadians value highly the good-will of the American people, and fully reciprocate the feeling. Now that the United States has thrown its great energy and resources into the scale with the allies we look forward to the day when the Huns will taste their steel.

Woodwork for Returned Soldiers

Canadian soldiers who were carpenters before they went overseas and returned disabled for such work will be given opportunity to take up pattern making, one of the most advanced phases of woodworking.

Carpentry classes have been large in all the institutions established or taken over in part by the Military Hospitals Commission for the vocational training and industrial re-education of the returned soldiers. They are made up both of boys who intend to follow the work in its higher branches of cabinet making, interior finishing and pattern making, and those who are following the work merely as a therapeutic measure during their convalescence, with perhaps the second motive of picking up a little useful knowledge which will round out their abilities as house-holders and home-makers.

There is no course in which the therapeutic value of the work is greater. The work provides variety, moderate activity and quick results. It takes only a short time for a man to make something interesting and useful, and the task can be increased as he is able to attempt bigger things.

In the higher branches of the work many men are qualifying for positions which will yield them good wages. Cabinet making offers an opening for skilled workmen with artistic tendencies and an eye for fine work and detail, while pattern making has equal attractions for the mathematical mind.

Pattern making pays well and many soldiers will make good in this line from present indications. Even though the skilful man has lost one or both legs he is as valuable in this line of work as a whole man, and his disability presents no handicap.

The Duty of Canadian Manufacturers

The following letter from Mr. H. W. Strudley, of the Imperial Rattan Company, Limited, of Stratford, Ont., in reply to our request for an expression of opinion on the business outlook for 1918 appears to us to hit the nail squarely on the head:—

Stratford, Ont., Dec. 5, 1917.

Editor Canadian Woodworker:—

"There is no cloud on the commercial horizon at present. Of course the future state of business depends largely on the duration of the war and the extent of our participation in it. If we do our duty—and I think we will—we shall put all our resources into winning the war. If we do this it might mean that some now essential industries would have to be re-equipped to take care of essentials.

"I make the prediction that we will all be in government service 'ere long, either serving at the front or at home, that all profits will be cheerfully eliminated in the interest of the state and that we who cannot serve overseas will be serving at home doing the thing we are best qualified for, cutting out luxuries, increasing the supply of, and saving food stuffs, and generally equipping ourselves to be worthy of a place in the front of the Empire and worthy of the boys who have given their all for us.

"In keeping the home fires burning, every patriotic manufacturer will keep his business in such flexible position that he can serve the government in such requirements as they may need and at the same time keep his regular line of business organized and alive so that immediately the war is over he may be able to employ the boys who return, in their regular occupation.

"There is need and use at home for every person who is able to work to take the places of those who are to serve in the present draft, and will be so long as we do not show any yellow streaks.

"We need not worry at present about business; all of our concern needs to be whether or not the nerve of Canada is going to match the nerve of our Allies. If it does, Canada will remain on the map as a great nation in the building. If it does not, we will join 'No Man's Land.'"

After all, the big thing is that we shall conduct ourselves to-day, that after the war is over and we all have time to sit down and take an inventory, Canada shall fell no shame and no regret at the course she has followed.

Special facilities for cables to overseas are announced officially for week-end cable letters at cheap rates to or from Canadian soldiers, sailors, and nurses on overseas service. The letters must be of a social character, and can be cabled at 5 cents a word to or from Ontario.

The Business Outlook for 1918

Canadian Furniture and Woodworking Plants Anticipate Continuance of 1917 Conditions with the Exception of Higher Prices—General Note of Optimism Prevails

The following letters have been received from furniture manufacturers and woodworking firms in reply to our request for their views regarding the probable trade conditions likely to prevail during 1918. The letters are decidedly optimistic, coming from manufacturers who have, during the three and a half years the country has been at war, experienced almost unprecedented conditions—labor shortage, increased cost of material, lack of cars to ship their products, and numerous other difficulties. But it only goes to show that, despite the difficulties, Canadian furniture men and woodworkers will "carry on":

Your question as to what conditions will prevail during 1918 is a very large one. There are so many different elements entered into—the question of conscription and the course of the war, etc.—that we hardly care to express our opinion.

As far as our factory is concerned, we have box orders to take us up to about the end of March.

As far as local building trade is concerned, we think that it will at least equal what it has been this year, which is not very much. We think there is every reason to believe that lumber will continue to go up in price; especially will this be true if conscription takes effect.—McAuliffe-Davis Lumber Company, Ltd., Ottawa, Ont.

* * *

This is a very difficult question to answer, and we have not been giving it much thought as yet. We have been very busy getting out new designs for 1918, which has taken up our time, but we are looking forward to a fair trade. With the large increase in orders for munitions, etc., and with the large crops that prevailed throughout Canada this year, which is selling at a very high price, there should be a large circulation of money. To offset the above there will be the higher prices, which are bound to go still higher, and this will, no doubt, have a tendency to keep or hold the consuming public back when certain kinds of necessary luxuries are taken into consideration.—The Ellis Furniture Company, Ingersoll, Ont.

* * *

We are quite confident that business, during the first six months, at least, of 1918, will be very good. The recent highly successful floating of the Victory Loan proves that Canada is very prosperous, and there is consequently no reason to believe that there will be any lull in business operations.

There is no doubt, in our estimation, that higher prices will prevail in most every line. This may curtail operations in some directions, but, on the whole, Canada has nothing to fear, so far as we can see, for the first six months, at least, of next year.

We trust that this opinion will be of some little service to you, and thank you for the opportunity of placing our views for you in this way.—Ontario Manufacturer.

* * *

At the outset we had our fears as to the trade conditions for the year just closing, but are most happy to inform you that the volume of trade has exceeded our anticipations by a very considerable amount, and, basing our conclusions upon this fact, we have no hesitation in stating that our confidence has in no way dropped as to the prospects for the coming year. While indications from other quarters seem to hang as a dark cloud upon the future, nevertheless business conditions have been wonderful in Canada so far, and unless something entirely unlooked for should take place, we firmly believe that trade conditions will continue at least as favorable as they have been during the last six months.

There is one favorable feature of the present situation and that is the Victory Loan, which has been largely oversubscribed, and this, we feel, should enable the government to secure considerable war orders to keep Canadian factories busy. If that results, we are confident that trade conditions will continue equal to what they have been during the present year.

We shall be pleased if this opinion on our part is of any value to you.—Ontario Manufacturer.

* * *

Answering your question of December 3, "What conditions will prevail in 1918?" we put this question to ourselves for every month of the year, but give it the deepest thought at the end of each year, as it is very essential to make a good start at the beginning of the year.

We believe that the prospects for next year are very good, and expect to keep our plant in operation with increased capacity. The demand for goods is great and the prices all right. Business is very good, more specially in country towns in Ontario and Quebec, as the farmers have plenty for sale at more than double the prices they used to get, whilst the increase in general for goods they purchase has certainly not doubled; so they are satisfied, and they buy more than they used to, and better goods. The only weak point is scarcity of labor, but we have to take means to master that part of it, and those who will produce good designs and finish and ship promptly ought to have reason to be optimistic about 1918.

Wishing the new year to be a United Canada, happy and prosperous.—St. Lawrence Furniture Company, Riviere-du-Loup, Que.

* * *

We are looking for fairly good business during the first six months of 1918. Labor at the present time is well employed throughout the country, and Canada has been well favored with splendid crops, bringing high prices. In our opinion, extra business west of the Great Lakes should replace any falling off in the trade in the Provinces of Ontario or Quebec.—The Bell Furniture Company, Ltd., Southampton, Ont.

* * *

We really do not feel competent to express any important views on what conditions will prevail during 1918. Were the Dominion elections over, we feel we might then forecast business prospects for 1918 with some degree of accuracy, but as practically everything in this regard hinges upon the return of the Union Government in order to establish confidence, which is always the basis of trade conditions, we feel it would be very difficult to forecast the trade for the coming year.—The George McLagan Furniture Company, Ltd., Stratford, Ont.

* * *

Using as a basis the requests which we receive now for goods to be shipped in January and February, we judge that the requests will be much more considerable than we can manufacture, owing to the difficulty of procuring the mater-

als, and especially the workmanship.—The Canadian Rattan Chair Company, Ltd., Victoriaville, Que.

* * *

We expect that the present large demand for our products will continue, we having no reason to think otherwise,; but we will certainly be manufacturing under great difficulties, owing to the increasing scarcity of labor and materials. These conditions will, of course, make our costs much higher, and will necessitate still higher prices.

Although we keep as close a watch as possible on our increasing costs, we find it almost impossible to keep up to these increases with our selling prices. We trust that the above will be of interest to you.—The Knechtel Furniture Company, Ltd., Hanover, Ont.

* * *

Everything points to a good building trade in most districts, which may be curtailed, of course, to a certain extent, on account of scarcity of laborers and mechanics. If prospective builders would start operations early in the spring, we do not think the scarcity of labor would be so very serious, but it is from August to November when this trouble is at its worst. At this time the bulk of the men obtain work harvesting at much higher wages than they can obtain otherwise. Insofar as the cities are concerned, taking Saskatoon as an example, we believe there will be considerable house building next year. This present season has been the best we have had for some time in the city though the buildings erected were largely warehouses of the better class, but next year there is every prospect that quite a number of good residences will be put up.

On the whole, therefore, we are looking forward to at least as good a season for our line as we have had in 1917.—Cushing Brothers, Limited, Saskatoon, Sask.

* * *

We look for 1918 to be a somewhat quieter business year in the furniture manufacturing trade, owing to the very large amount of capital being tied up in the Victory Loan. We feel that the purchasing power of the community for furniture will be somewhat curtailed. However, we feel that when the money begins to circulate for contracts by the United States for munitions, that this will have a beneficial effect on trade generally.

We feel hopeful regarding the Western business for the reason that so much money has gone into the West for grain, and the prices being so high for all products of the farm that the farmers of the West will have considerable money to spend and when this begins to circulate through the East it will have a beneficial effect upon the eastern trade.

We feel that 1918 is not likely to be as good a year as 1917, but we do not look for any great falling off until after the close of the war. However, we think that every manufacturer should face the situation and try and curtail in every respect in anticipation of the close of the war.—The F. E. Coombe Furniture Co., Ltd., Kincardine, Ont.

Trade Conditions at Montreal

Staff Correspondence

In the December, 1916, issue of the "Canadian Woodworker" we published an article summarizing the conditions that had prevailed throughout the year and made a forecast regarding the volume of trade that might be expected during 1917. The consensus of opinion at that time was that everything depended upon the war, and this is still the general view as applied to the outlook for the coming year.

In some directions hopes for 1917 have been falsified, while in others anticipations have been exceeded. Speaking generally, woodworking firms anticipate a fair year's business, but—and a lot depends on this—much of it is absolutely contingent on war orders. While peace would seriously affect the shell box makers, it is quite likely that it would favorably affect the sections, such as sash and door makers, who have been hit very hard by the slowness in the building trade consequent on the war.

The high cost of erecting houses has been prejudicial to building, and although the demand for flats and small houses is exceptionally good, contractors are not inclined to build on speculation nor are many investors willing to lay out their capital having regard to the abnormal cost of labor and materials. The permits show a falling off for the eleven months of the year of $706,000, evidence of the state of the trade. Prospects then for the firms relying on building are not encouraging. "The sash and door business," said the head of one company, "is practically dead, and I see no hope of a revival just yet."

The sheet anchor of the woodworking industry is shell boxes, and here the outlook is regarded as more promising so far as orders are concerned. The present year has been satisfactory from the point of the number of contracts, mainly for small boxes. The day of the Bethlehem box is past, as no more orders will be given out. Although orders generally have been all right as to volume, the question of prices is another story. All the shell box manufacturers complain of the system under which the Imperial Munitions Board gives out contracts, and by which they secure prices which leave little or no profit to the makers. The blame also partly rests on the manufacturers themselves—some tender at values which are admittedly inadequate, and having thus set a standard others are almost forced into line, with the alternative of shutting down, dispersing their staff, and generally disorganizing their establishments.

That the complaint of inadequate prices is justified may be judged by the fact that during the past year several firms have gone into liquidation, while others financially sound have ceased to make shell boxes. The policy of distributing the orders pursued by the Board involves a want of continuity in work, and also, when the weaker firms go to the wall or are unable to fill the contracts, handing over to stronger hands the carrying out of the contracts only partially filled by the smaller concerns. This often means an increase in price, and it is therefore questionable whether, in the end, the Munitions Board is much the gainer by the method of cutting down makers to the last cent.

There has been a slight improvement in the orders for better class furniture; but makers do not speak very optimistically of 1918 prospects. Piano factories had a fair year, although materials are difficult to obtain, and the chances are that next year the scarcity will be more acute.

The demand for veneers has been medium, and the outlook is promising. During the coming year there is likely to be established in this province a plant for cutting veneers from Canadian hardwoods.

As in 1916, labor is in short supply, and wages are higher. Materials are also dearer, and it is certain that there will be a further advance in lumber of all descriptions.

It is impossible to say definitely what 1918 will bring forth, but the evidences are that the year will not be worse than the twelve months now closing, and in the shell box department more activity will be shown, providing, of course, that the war continues.

Gold Medal Furniture Company's Cost System

Worked Out by the Superintendent of Their Uxbridge, Ont., Plant—Various Forms Used Are Shown Here—Company Employs Number of Women

Staff Article

We are indebted to Mr. C. W. Young, superintendent of the Gold. Medal Furniture Manufacturing Company's plant at Uxbridge, Ont., for the details of a cost system which is described in this article. We recently had the pleasure of visiting this factory, and found it exceedingly busy. Despite this fact, however, Mr. Young took the time to explain his cost system to us and show us over the plant.

At their Uxbridge plant the Gold Medal Company manufactures parlor frames, frames for upholstered furniture, music cabinets, besides cabinets for the Columbia and Pathe Freres talking machines. The work is, therefore, pretty varied, and a cost system that would meet their requirements would be applicable in almost any furniture factory.

The company have a thoroughly up-to-date plant, equipped with the best labor-saving machines. One of these machines, which was added about a year ago, and which the company say has greatly assisted them in their efforts to turn out a high-grade product, is a ball-bearing shaper, made by the Preston Woodworking Machinery Company, Preston, Ont.

The working of the cost system, the forms for which are illustrated here, is as follows: The employees are provided with a pad of job tickets, on which they record their time. These tickets are 5¾ inches by 4 inches, and are filled in as shown. They are handed into the office each day, and a girl transfers the information to the cost summary sheet. The size of this sheet is 18½ inches by 13¾ inches.

All material entering into the job—lumber, veneer, stain, filler, etc.—is tabulated from the requisitions on to the material sheet shown at the bottom of this page. This sheet is 10½ inches by 7½ inches. When this is totalled up the total is entered on the cost summary sheet as shown.

By adding up labor, shop expense, material, and general expense the total cost of the job is obtained. The price allowed for the job is shown on the cost summary sheet, and by adding or subtracting the total cost of the job the loss or gain is indicated.

When making up the cost summary sheet the clerk enters the time for boys helping at machines as follows: It is known which machines require helpers. Therefore, the same number of hours are charged for the helper as the man has entered for the job. In this

TOTAL COST: LABOR 101 50; SHOP EXPENSE 74 02; MATERIAL 160 67; FACTORY COST 336 19; GEN. EXPENSE 30 45; TOTAL 366 64

COST EACH: 1 01; 74; 1 60; 3 36; 30; 3 67

COST SUMMARY

DATE Oct 13/17 CAT. No. 416 DWG. No. 97

BONUS; PRICE ALLOWED $390.00; PRICE MADE AT $366.64; GAIN $23.36; LOSS

PROD'N ORDER 918; CUST'RS ORDER 421; S.O. No. 341; DATE RECD 3/17; ORDERED 100 MADE 100

DEPT.	NAME	DATE RATE	Oct. 13	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	HRS.	TOTALS
Swing Saw	J. Smith	35	10hr. 3 50	10hr 3 50	10hr 3 50	5hr 1 75	2 70																						37	12 95
Rip Saw	B. Jones	35		10 3 50	10 3 50	1 35		2 70																					23	8 05
Surfacer	T. Hannah	30				10 3 00	10 3 00	5 1 50																					25	7 50
planer	M. Hadden	30				5 1 50	8 2 40	3 90																					16	4 80
Sticker	J. Hamilton	35							10 3 50		10 3 50																		20	7 00
Glue Jointer	M. Fursen	30										10 3 00																	10	3 00
" Jointer	W. Whiteside	32½											10 3 25																10	3 25
Veneering	J. Snow	32½												6 1 95															6	1 95
"	W. Tells	20												6 1 20															6	1 20
"	P. Gimp	15												6 90															6	90
Surface planer	F. Hill	30													10 3 00	2 60													12	3 60
Bandsaw	J. Timmins	35																5 1 75											5	1 75
Shaper	H. Hall	40																	5 2 00										5	2 00
Trim Saw	G. Tell	30																		10 3 00									10	3 00
Sander	B. Johnson	32½																			10 3 25								10	3 25
Boring Mach	N. Hammel	30																				8 2 40	3 90						11	3 30
Bench	J. Jones	30		10 3 50																			4 1 20	6 1 80	10 3 00	10 3 00	2 60		32	9 60
"	A. Smith	30																							10 3 00	10 3 00	10 3 00		30	9 00
Filling & Staining	P. Hughes	27½																									10 2 75	10 2 75	20	5 50
Shellacing	C. Hanson	30																										8 3 00	10	3 00
Sanding	" "	30																										2 60	2	60
Varnishing	J. Nolen	35																										10 3 50	10	3 50
packing	W. Hood	30																					10 3 00						10	3 00
																													326	101 30

The cost summary sheet onto which all cost information is transferred.

MATERIAL SHEET

Lumber and Veneers	Grade	Ft. Used	FT WASTE	PRICE PER M	Total	TOTAL PRICE
1401 ft ¼ Oak	#2	1121	280	36.00	1401 ft	50.44
200 ft s. elm	#1	175	25	25.00	200 "	5.00
75 " pine	#2	60	15	18.00	75 "	1.35
						56.81

Finishing Material	Amount	Price	Total
Stain	5 Gal.	1.80	9.00
Filler	18 lbs.	8	1.44
Shellac	4 Gal	3.60	14.40
Varnish			
Rubbing Material			
P. Stone	2 lbs.	4	8
R. Oil	1 Gal	28	28
S. paper	36 pcs.	1½	54
			43.74

PACKING MATERIAL		Amount	Price	Total
Lumber	Elm	900 ft	14.40	
Hessian	X			
Excelsior		100 lbs	1.50	
Paper	Brown Heavy	50	5.50	
Nails	2½"	20 lbs	1.40	
Screws	1½"	4 Gross	1.20	
Twine	Medium	5 lbs	1.00	
Cardboard	X			
Pulls	N. Co. Single	200	6.00	
Hooks	X			
Elbow Catches	B.J.	100	1.50	
Shelf Supports	X			
Escutcheons	N Co. K	100	1.00	
				33.50
				56.81
				43.74
				26.62

Total $160.67

		Amount	Price	Total
Glue	Jointing	5 lbs	35	1.75
	Veneering	20 lbs	23	4.60
Nails	1"	2 lbs	17	34
	1½"	3 "	12	18
Screws	1"	5 Gross	25	1.25
Casters	#2	100 Set	8	8.00
Butts	1½"	200 pr	3½	7.00
Keys	1¼"	100	1	1.00
Locks	#1	100	2½	2.50
Glass	X			
Mirrors	X			

BONUS WORK

NAME RATE PER HOUR DATE TO

DATE	NO OF PIECES	NAME OF ARTICLES	PIECE WORK PRICE	TOTAL	RATE PER HOUR	NO OF HOURS	TOTAL WAGE	GAIN	LOSS
TOTALS									

WEEK'S REGULAR WAGE $

WEEK'S PIECE WORK WAGE $

LOSS $

GAIN $

CLERK'S INITIALS

No. _____ REPORT FOR TWO WEEKS DATE _____

Dept.	PRODUCTIVE WAGES	PER CENTAGE	PROVIDED	FIXED CHARGES	SUNDRY EXPENSES	NON-PRODUCTIVE WAGES	TOTAL CHARGES	DEFICIT	GAIN
M									
O									
F									
Uph									
A & P									
Gen									
Totals									

NETT GAIN _____

OFFICE MGR. SIG. _____ UXBRIDGE

SUPT SIG. _____ UXBRIDGE

MGR. DIRECTOR SIG. _____ TORONTO

REMARKS:

DAILY SHEET BONUS WORK

WORKMAN'S NAME DATE 191

NO OF PIECES	NAME OF WORK	RATE	TOTAL HRS	MIN	FOREMAN O.K.
TOTAL					

TO BE FILLED OUT IN OFFICE

REGULAR WAGE RATE PER HOUR

CLERK

JOB TICKET

	CAT. No.	S. O. No.
S. E. Cabinet	416	341
		DATE Oct 17

OPERATION	DEPT.	No.	EMPLOYEE
Swing Saw	M.	31	J. Smith

QTY. O.K. X	PIECES		100			
QUAL'Y O.K. X	FINISHED	6	RATE	PER	AMOUNT	
	STARTED	Y				
HOURS O.K.	HOURS	10	35	Hr.	3	50
SUPT'S O.K. J.W.S.	DEBIT ACCOUNT 421			ON SUMMARY A.M.	DISTRIBUTED C.M.	

Forms used in connection with the Gold Medal Furniture Company's cost system.

way it is not necessary to have the helpers make out job tickets.

When the employees make a gain over the price set for a job they secure the amount of the gain as a bonus. The company thus maintain an organization of loyal and efficient employees who are not easily tempted away by other offers of employment. The daily and weekly forms used for bonus work are shown here. The daily sheet is 6 inches by 6¼ inches and the weekly sheet 10¾ inches by 7 inches.

A feature of this cost system is the fortnightly report. This report enables the superintendent or office manager to see whether the percentage of overhead provided for each department is sufficient, and, if not, to make the necessary adjustments. The form used for this fortnightly report is shown.

The Gold Medal Furniture Manufacturing Company employ quite a number of women at their Uxbridge plant, and state that they have found them efficient and neat workers. They have them employed in the finishing room, gramaphone department, shipping department, and machine and cabinet rooms.

The operator on one of the elevators is a lady, and when the writer was visiting the plant she was industriously engaged in knitting socks during the occasions when the elevator was not required. We do not remember ever having seen a male elevator attendant doing such useful work between trips. The socks were no doubt being made for a brother or other relative who is "playing the game" "somewhere in France." All honor to the ladies who are "carrying on" at home! They have proved themselves worthy of the best we can give them.

Differences in Texture of White-Wood

By W. B. Stokes, photographic chemist, Forest Products Laboratories of Canada, Montreal.

Every experienced woodworker knows that there may be a marked difference between two pieces of the same kind of wood as regards hardness and weight. In some processes of manufacture these differences may be a cause of trouble. An instance of this was brought to our notice by a manufacturer of hat-blocks. The wood used by him was whitewood, often known as yellow poplar, but more accurately as the wood of the tulip tree (Liriodendron tulipifera). The making of hat-blocks has several stages, intervals for more complete drying being necessary between the operations. In one face of the roughly shaped blocks a sunken knob was turned and it was often found that large checks appeared later right across this knob. Turning the knob would doubtless expose a large surface to the drying action of the air and cause unequal drying, but the turner declared that these checks occurred mostly in blocks made of hard and heavy wood and seldom in the soft, light wood. The matter seemed therefore one of selection rather than of treatment, which was fortunate, for seasoning and drying experiments are for the present impracticable with us. I therefore secured samples of hard, heavy whitewood and soft, light whitewood as used by this manufacturer and investigated their physical characters with these results:

Number of specimen	1	2
Hardness (relative)	Hard	Soft
Weight per cubic foot	31 lbs.	25½ lbs.
Rings per inch	10	27

It will be seen that the harder sample, No. 1, was 20 to 25 per cent. heavier, bulk for bulk, and that it was of much more rapid growth than No. 2. It added 1/10 inch per annum, while No. 2 only added 1/27 inch.

This is a fairly general rule for Canadian and United States hardwoods; rapid growth means greater density. The reverse of this is usually true for softwoods (pine, spruce, etc.). Counting the number of annual rings per inch would therefore seem a practical method for selecting a suitable piece of whitewood, even when in the lumber yard. A cut with a sharp pocket-knife across the end of the piece would leave a smooth surface which could be examined with a lens. This would show whether the number of annual rings per inch was small or large; in other words, whether the growth was rapid or slow. Where requirements are exact the method might be worth adopting.

To show the meaning of greater density (weight per cubic foot) or how one may have more wood in a given bulk, one must examine the minute structure of the wood with a microscope. To do this it is necessary to cut extremely thin slices or sections and prepare them for examination. Our wood technologist, Mr. H. N. Lee, made these sections and examined them under the microscope. He pronounced them to

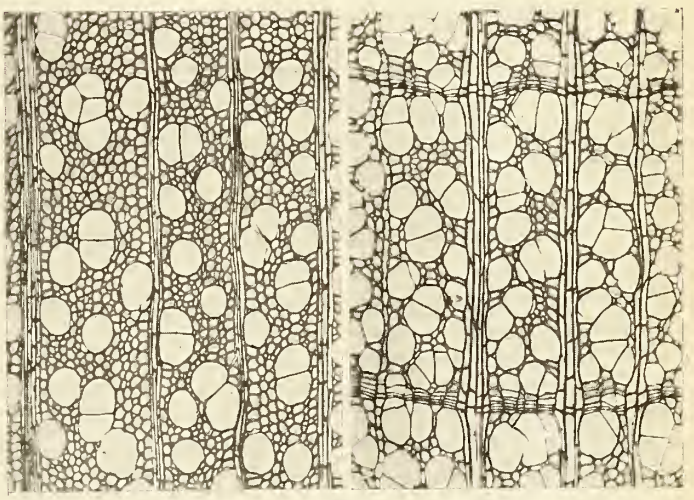


Fig. 1. Fig. 2.

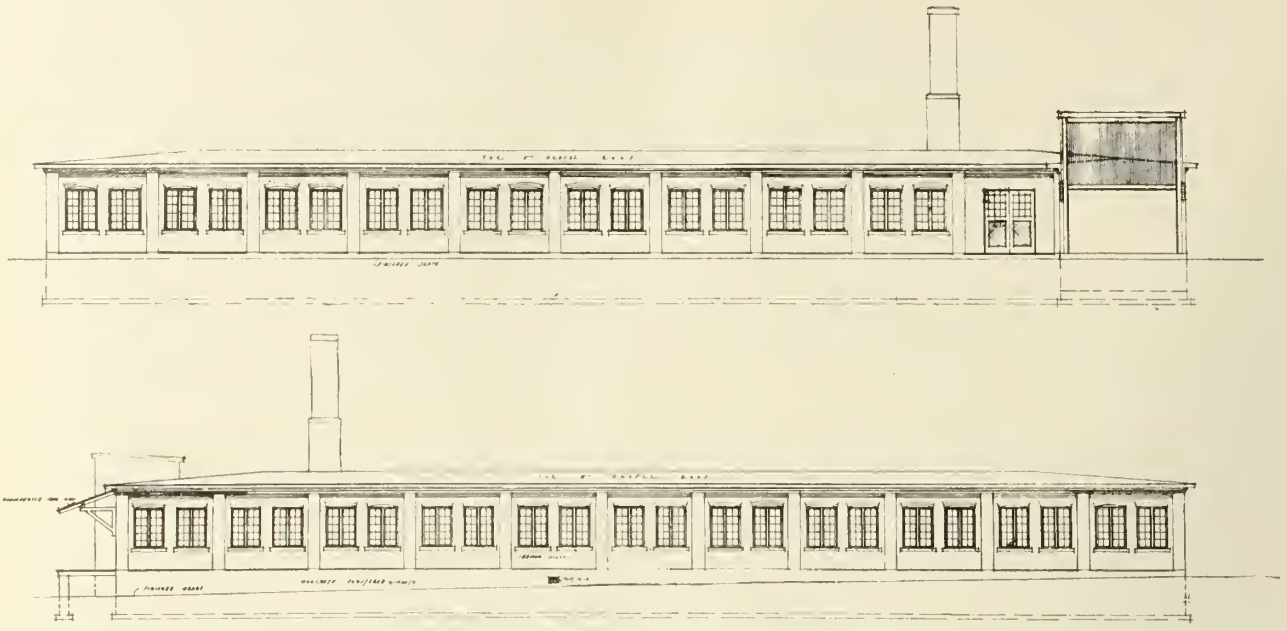
Cross sections of two pieces of poplar showing great difference in density.

be both wood of the tulip tree and not two different species, and then handed them to me to be photographed with the help of a microscope. These photographs show that No. 1 is more compact in structure and that the cell walls are thicker than in No. 2, which is looser and more delicate in its formation. In No. 2 is included a year's growth, but it was impossible to include a year's growth of No. 1 at the same scale of magnification.

Canada Machinery Corporation Enlarging Plant

The Canada Machinery Corporation will erect a steel and brick extension to their plant on Water Street South, Galt, Ont.

In view of the present high cost of structural steel and the difficulty of obtaining such material, the company are utilizing the building owned by them in Hamilton, and this structure is being dismantled and re-erected in Galt. This extension will give the company about 24,000 square feet of additional floor space, and will give employment to one hundred additional workmen.



Side elevations of the Arnprior Cabinet Company's new factory.

New Woodworking Plant at Arnprior, Ont.

Will Manufacture Office Furniture and Cash Register Cabinets—Operations May Start Early in January—Illustrations Show Arrangemen of Plant

Staff Article

The plant of the newly-organized Arnprior Cabinet Company, which is at present being erected at Arnprior, Ont., and which will commence operations about the first of the year, is illustrated here. The layout of the plant is somewhat unique. It was at first proposed to erect a three or four-storey building, but, as land was comparatively cheap, the company purchased six acres and arranged to have all the manufacturing operations on one floor, thus eliminating all handling of material up and down on elevators.

The illustrations show two elevations and the floor plan of the building. The layout of the machine room, indicating the arrangement of the machines and blower system, is also shown. The blower system and also the dry kiln are being installed by Sheldons, Limited, of Galt, Ont.

The plans for the building were drawn by Richards & Abra, architects, of Ottawa, and they have succeeded in designing a building that has all the evidences of being an ideal one from the standpoint of economical production.

The arrangement is such that the lumber enters the kiln at one end of the building and proceeds, without any danger of sidetracking the material, through the various processes of manufacture till, by the time it has been finished, it is right at the shipping platform.

The lines the company will manufacture are filing cabinets, desks, commercial furniture, and cabinets for cash registers. The filing cabinets and desks to be made are those handled and formerly made by the Library Bureau of Canada, Ltd. The line comprises vertical unit cabinets, correspondence units, legal cap units, bill or credit file units, order file units, voucher, check, or note file units, document or voucher file units, architectural file units for plans, sketches, etc., map cabinets, index card units, bookcases, and cupboards. Most of these articles are made in a variety of sizes, styles, and combinations to suit the requirements of various business offices.

The desks to be made by the company are in a number of designs, both flat and roll top. Besides the desks and filing cabinets, the company's line includes unit shelves and other accessories forf the fitting up of libraries. The shelving is made, as stated, on the unit principle, and is furnished in sections 3 ft. wide, in two heights—4 ft. 6 in. and 6 ft. 10 in. The shelves are 8, 10, and 12 inches deep.

The lumber to be used by the Arnprior Cabinet Company will include oak, mahogany, walnut, birch, and poplar. The oak used will be white, quarter-sawed stock. The company state that all oak entering into their products will be carefully selected and matched for beauty of color, grain, and figure. The mahogany, they say, will be chosen for color, figure, and fibre, and finished in the standard library bureau colonial finish, as this brings out to perfection the natural beauty of the wood. A Paasche air brush, made by the Paasche Air Brush Company, of Chicago, will be installed in the finishing room.

They further state that with the goods they will manufacture particular attention will be paid to construction and the finish of the interior parts. The interiors will be of hardwood throughout, and the best grade of desks will be made of solid oak or mahogany.

All desk drawers will be dovetailed front and back. Drawer bottoms will be three-ply, panelled into the sides, and held in place by a spring device, allowing the bottom to adjust itself to atmospheric changes without cramping the drawer.

Writing beds or tops of desks will be of built-up,

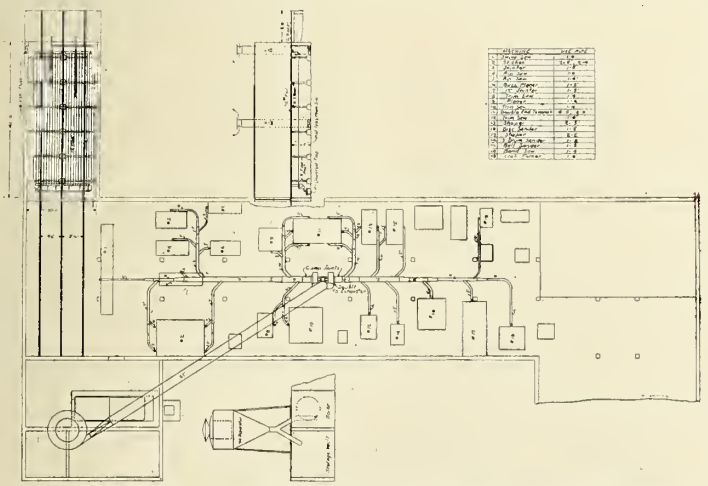
laminated, reinforced construction. The company say that this is the most costly construction for tables, but is the only sure method of preventing warp, check, or split. Legs will be of built-up mitred construction, showing the natural figure of the wood on all four sides. The desk frames are held together by threaded rail bolts. Mouldings are cut from the solid wood and not nailed or glued on. Panels are of solid wood, of large surface, and laid flat.

The company say that the tops of all their filing cabinet units will be built of five-ply, the core to be chestnut, with grain running from front to back. The secondary veneers are glued to this core, with the grain running crosswise. These are covered both top and bottom with another ply, using quarter-sawed Indiana white oak veneer on the top. The grain of these outer plies runs from front to back, as in the chestnut core. This construction is said to prevent shrinking, swelling or warping.

The assembling of the skeletons of the filing units will be mostly accomplished by metal forms and clamps, thus giving accuracy. In the final assembling all the parts will be set in a specially-constructed press, where they are mechanically forced together. While thus held they are screwed, nailed, and thoroughly reinforced in the angles with glue blocks, producing the uniformity necessary for a perfect working cabinet. When the glue is thoroughly set the clamps are removed and the shell is ready for sanding.

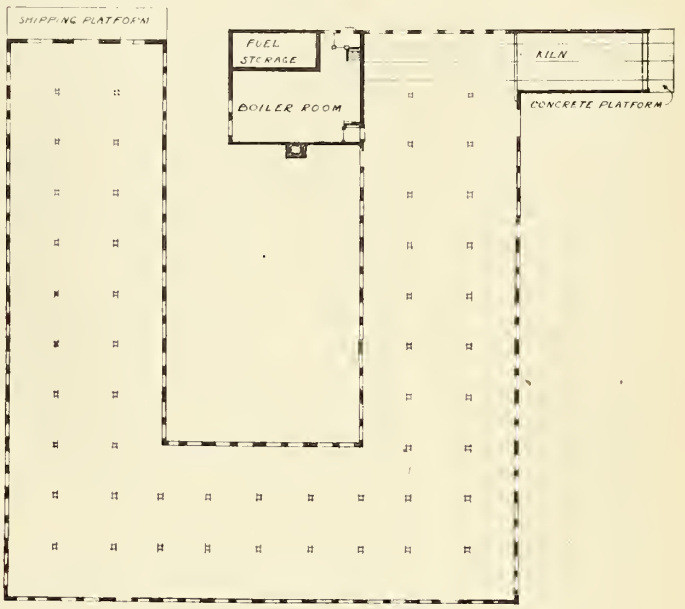
The drawer construction for the filing cabinets is as follows: The drawer fronts are of solid oak, with the sides and back of birch, dovetailed at the rear corners. The sides are wedge tenoned into the drawer front, giving great strength of construction. The bottoms are of poplar, and are so glued and nailed as to allow a reasonable swelling or shrinking under unfavorable climatic conditions.

The vertical file drawers are equipped with the Library Bureau progressive ball-bearing roller extension slides. The company say this slide is a practically frictionless and perfect progressive ball-bearing drawer slide. The extension slide is a heavy gauge metal, so formed at top and bottom as to give the strength necessary to carry the drawer load. This extension slide carries three large ball-bearing wheels. Two of the ball-bearing wheels are placed in the bottom channel of the extension slide, one in front and one in the centre. One ball-bearing wheel is placed in the top channel of the extension slide at the rear. These ball-bearing wheels are accurately adjusted to case slide, ensuring practically frictionless bearing at these points.



Machine room and dry kiln, showing layout of machines and blower system. Numbers on machines correspond with numbers in diagram above.

The centre ball-bearing wheel, in conjunction with the wheel, forms a compression against the drawer slide, which accomplishes the progressive feature. Leather stops are fitted to the extension and case slides for the purpose of noiselessly stopping the drawer when pulled out its entire length. The drawer may be easily removed by lifting at the front, disengaging the catch which holds the drawer in place.



Floor plan of factory.

Locks used on vertical and counter height unit cabinets are fitted with automatic locks. The lock is a combination lock and push-button, made for the Library Bureau cabinets. An elliptical piece of bronze approximately one-half inch by three-quarters of an inch, having in its face a standard Yale keyway, protrudes through the facia of the unit. A slight turn of the key automatically releases it, the face of the lock coming out three-eighths of an inch. The cabinet is locked by pushing in the face of the lock, no key being necessary. Drawers which have been left out can be pushed in, at the same time being automatically locked. These locks can be furnished master-keyed when desired.

Before finishing, all units are carefully inspected to see that they are absolutely smooth on all surfaces and free from blemishes. The wood is then carefully treated with a combination filler and stain until the pores are completely filled. The excess filler is then rubbed off and the surface thoroughly cleaned. The finish is produced by successive coats of high-grade varnish, sanded between the coats with fine polishing paper. The final coat is hand-rubbed to the standard Library Bureau eggshell gloss.

The officers of the Arnprior Cabinet Company are: H. J. Daly, vice-president of the National Cash Register Company, president; R. J. Simpson, vice-president and managing director; R. H. Meagher, treasurer and superintendent; J. A. Frohock, secretary and general sales manager.

Another important thing is never to do the thing most apparent until you are sure it is the most important thing. Life is full of things that apparently are the best things for you to do, but do not run heedlessly or hastily into them until you take time to think whether those are the things most important for you to do.

Wood Plays Big Part in the Trunk Industry

Operations at Plant of Lamontagne Limited, Montreal—Large Amounts of Pine, Basswood and Three-ply Stock Used—Efficient Cost System

Staff Article

Although trunk making is not in the strict sense a woodworking industry, woodworking is an important element in the processes necessary to the manufacture of the large variety of goods which come under the classification of trunks. An examination of a trunk will show that a considerable amount of wood is used, and that it performs a vital part in giving strength to the product, besides providing conveniences for the owner of the trunk in the way of trays, etc.

A visit to the extensive factory of Lamontagne, Ltd., Notre Dame Street West, Montreal, indicated the part which wood plays in the construction of these goods. The company have two yards, storing about 1,000,000 feet of lumber, and a complete woodworking plant, electrically driven, with power generated by the company's own machinery. Besides trunks, the firm manufacture packing boxes for their own requirements, horses' hames and coat hangers. The lumber employed consists of pine for the cheaper trunks, basswood for the dearer varieties, three-ply for the highest classes, elm for cleats and hames, birch for coat hangers, and spruce for packing cases. The lumber comes to the plant in thicknesses from 1 inch to 3 inches and after being split and dressed on both sides some of it is reduced to ⅜ inch and some to 7/16 inch. The most important part of the work is the making of trays and covers for trunks.

The shop is located in the basement, with two yards adjoining. The lumber is piled here and then kiln dried, the kiln having a capacity of 15,000 feet. The pine is then sent to the rip saw, re-saw and double planer, which are situated near the kiln, after which it is conveyed by a slide into the sawmill proper. Here it is crosscut into the required sizes, afterwards going to the jointer and the matcher. This completes the process of manufacturing the ends, sides and bottoms of the trays and covers, which are nailed together by hand. The basswood undergoes the same operations, but entirely in the sawmill, and in addition is glued, to give it additional strength. The trays and covers are sent upstairs to be fitted into the trunks.

The cleats used are ¼, ⅜, 3/16, and 5/16 inch by 1¼ inch. The lumber is first planed, cut to size and completed on a Defiance cleating machine.

Making Coat Hangers

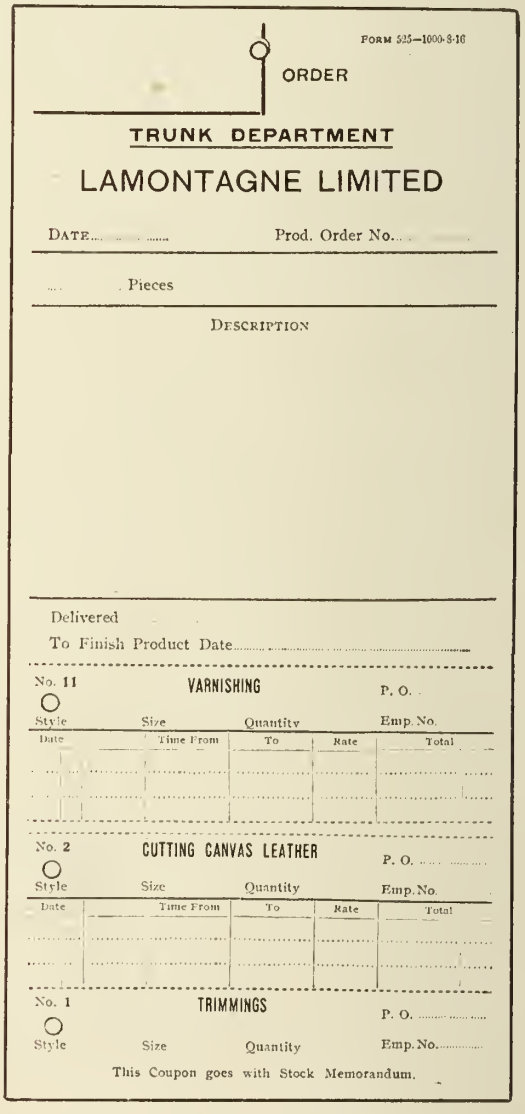
The coat hangers, of birch, are composed of two pieces of wood, and are made under a patent. Having been cut and planed, the pieces are put through a tenoner, the ends being then glued, forming a V-shaped stock, with a long groove at the point. Four holes are made by a spindle drill, into which wooden rivets, dipped in glue, are driven by hand. The stock is cut to shape by a band saw, and finished on a shaper. Afterwards a bar of wood is fixed at the two ends, this being used as the piece on which the coat is hung. The bar is strengthened by the insertion of wooden rivets; the iron hook at the top is also supported by similar rivets. The final process is sanding and coating with wax.

The hames are made from 2¼ to 3 in. lumber. After being ripped it is put into a steam box, prior to being placed on a bending machine. It is afterwards kept in an iron clamp for two or three days. When the bending is completed the stock is ripped, planed, bandsawed and sanded, ready for the irons to be put on.

The machinery in the plant was supplied by the American Woodworking Machinery Company, Canada Machinery Corporation, Galt; Foot Bart Co., Cleveland, Ohio; Superior Machine Co., Tidey, Newark; McGregor Gourlay & Co., Galt; Baxter D. Whitney & Son, Winchendon, Mass.; Crescent Machine Co., Leetonia, Ohio; Cordesman Machine Co., Cincinnati, Ohio.

Cost System

Lamontagne, Ltd., have a very complete cost system by which they can ascertain the exact cost of any given job or any portion of it. The factory is divided into mill, sawmill, trunk, suit case, etc., departments, different colored cost cards, some 19½ in. long, being issued to each department. The depart-



FORM 525—1000-8-16

ORDER

TRUNK DEPARTMENT

LAMONTAGNE LIMITED

DATE..... Prod. Order No.....

..... Pieces

DESCRIPTION

Delivered

To Finish Product Date.....

No. 11 VARNISHING P. O.

Style Size Quantity Emp. No.

Date	Time From	To	Rate	Total

No. 2 CUTTING CANVAS LEATHER P. O.

Style Size Quantity Emp. No.

Date	Time From	To	Rate	Total

No. 1 TRIMMINGS P. O.

Style Size Quantity Emp. No.

This Coupon goes with Stock Memorandum.

Cost card used by Lamontagne Limited.

Section of woodworking mill in plant of Lamontagne Limited.

ments are again sub-divided. Thus the sawmill is divided into nail dress trays, sawing dress trays, nail trays, nail boxes, matching, sawing trays, sawing boxes, planing lumber, and resawing lumber. The card, with all these sections printed on it, is given out with each job; at the top is the date, production order number, and number of pieces, together with a space for description, with delivery and finished product dates. Below, the card is divided into the various sections as mentioned, each section being similar to the ones illustrated, except, of course, the name varies according to the section. The sections for the various operations are numbered starting with the bottom one as No. 1.

The card is perforated, and on the job being given out the workmen receive the portion relating to their various machines or work. The workmen fill in the particulars as to time, etc., and when the job is completed the cards are collected and sent to the cost accounting department, where the data is copied on to a sheet, together with that from the trunk and other sections. The card for the trunk department is similar to the sawmill department and is shown here. It has sections for eleven operations. The cost department is also in possession of the cost of the lumber used, and with this and the other data is able to make up the entire cost of the job. The system acts as a check on the time of the workmen, as the total hours marked as being employed must correspond with the time punched on the clock.

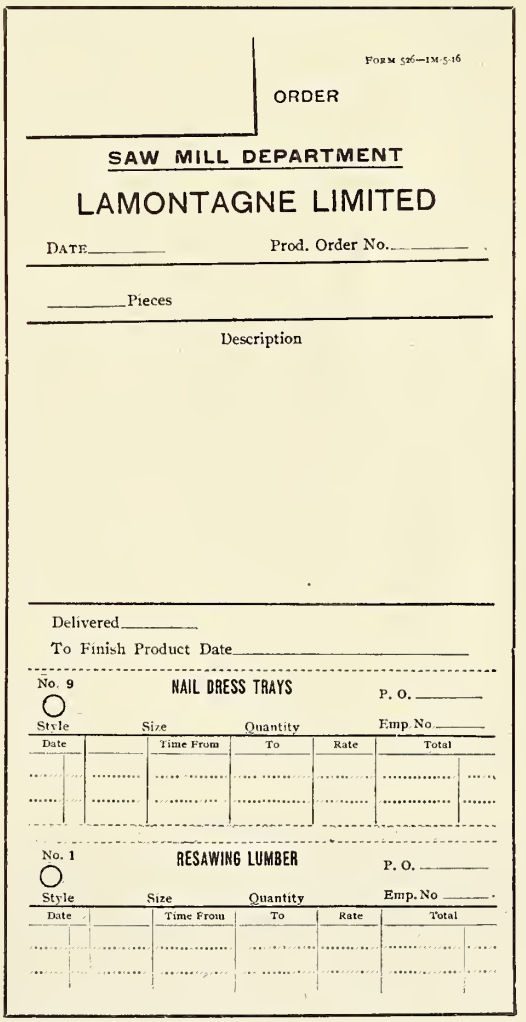
The principle of the system also applies to the manufacture of cleats. In this particular case a stock requisition is sent to the mill from the trunk department for a certain number of cleats. The cards are turned in in the usual way, and when the job, say of 50 trunks, is completed, data of the cost of cutting cleats is obtained from the cards, together with the cost of the lumber—this completing the information so far as the cleats are concerned.

As to Airplane Building

Furniture men, leave the airplane proposition alone. That, in a few words, is the advice of Major Charles R. Sligh, of the Sligh Furniture Company, of Grand Rapids, now an army officer connected with the War Department's airplane section. He speaks from the experience of a furniture manufacturer and from his inside knowledge of conditions surrounding and affecting the manufacture of airplanes.

"Mr. McClave and I have carefully gone into the proposition, and we are satisfied that we do not want to go into the manufacture of airplanes or airplane parts," said Major Sligh. "To begin with, it would mean the tearing out of present equipment and re-equipping a whole plant. Some furniture machinery might do in the manufacture of airplane parts, but, even admitting any furniture plant was properly equipped for making part or all of an airplane, what one of them in this country has the floor space for assembling the parts into the completed plane? Why, the Curtiss plant at Buffalo contains 1,750,000 square feet of floor space—nearly 50 acres under roof.

"One furniture concern in Philadelphia is filling a sub-contract for airplanes, and the Cutler Desk Company, of Buffalo, is doing some contract work for the Curtiss Company, but, so far as I know—and I am sure I am right—no other furniture concern in the country has any government or sub-contract for airplanes or their parts. The government has had scores of offers from manufacturers throughout the country—some of them from furniture men—to turn over their plants for the use of the government, inspired, it would seem, by patriotic motives; but, as has been true in many cases,



FORM 526—IM-5-16

ORDER

SAW MILL DEPARTMENT

LAMONTAGNE LIMITED

DATE_____ Prod. Order No._____

_____Pieces

Description

Delivered_____

To Finish Product Date_____

No. 9 NAIL DRESS TRAYS P. O._____

Style Size Quantity Emp. No._____

Date		Time From	To	Rate	Total

No. 1 RESAWING LUMBER P. O._____

Style Size Quantity Emp. No._____

Date		Time From	To	Rate	Total

Cost card used in sawmill by Lamontagne Limited.

because the concerns in question had no business and wanted to play safe. Very, very few such offers have been taken up by the government.

"Building airplanes is a business that must be carried upon a magnificent scale. I would say that no company could successfully go into such a business

with less than $1,000,000 capital—ten times as much as the average furniture concern is capitalized at. The bulk of the business to-day in this country is done by six companies in the Curtiss class. Then there are perhaps a score of small plants throughout the country. Furniture men could not compete with the half-dozen big companies in the country, and I believe that will be true after the war. The airplane certainly will be commercialized after the war. The demand will not be so great for machines as it is now, and it will be a case of the survival of the fittest as to what companies shall remain in business.

"As for shell boxes, that is merely a sawmill proposition, and I question if a furniture manufacturer with any sort of a good business would find it to his advantage to go into the matter, even though the demand for such boxes becomes great, in the event of the war continuing for a year or two. My advice to a furniture manufacturer with a good business is to sit tight on furniture."

Recently a committee representing the Grand Rapids Furniture Manufacturers' Association went over the Curtiss plant at Buffalo and another big airplane plant at Toronto, giving the subject of airplane manufacture a close inspection. While the committee found that much money is being made on airplane manufacture, it came home with the firm conviction that it would be an unwise move for furniture manufacturers to abandon their present lines and go into that field, and substantially for the reasons advanced by Major Sligh. None of them have any intentions of making the change.—Furniture Manufacturer and Artisan.

The Manufacture of Phonograph Cases

Dealing Particularly with the Fret Panels—Suggestions on Their Design and Finish—How to Secure Good Results in Jig Sawing Them

By W. J. Beattie

The production of phonograph cases has become quite an adjunct in a number of furniture factories during the last few years. A furniture factory is the best adapted for such work as it is in the same class as the average run of goods produced in such plants. This article will deal only with the very prominent part the fret sawed panels have in the appearance of the phonograph case.

While all designs of cases do not have these panels, using doors which are manipulated to control the tone volume, the ones having fret panels have a separate tone control and the case then has the same appearance under all circumstances. We will not enter into the merits, or otherwise, of different ideas, at present, however. The fret panels are invariably made of five ply stock, which gives great strength, lightness and durability. The illustrations of panels accompanying this article are of the light three-sixteenth stock which are held in a movable frame by strips, in the same manner that a mirror might be.

Fret panels that are made heavy enough to slip up into a groove at the top and drop into a groove at the bottom, have to be made too heavy and woody looking to look well, though in a cheap case such an arrangement may be allowable. In the method of the panel enclosed in a frame the lower edge of the frame has two wooden tapered pins that drop into corresponding holes and the top edge is provided with two spring catches. The frame is thus easily removed when necessary, as the finger tips can be slipped through the fret work to get a grip.

Fret work may be objected to by some as being too hard to finish properly, as there are so many corners and angles to catch varnish or pumice stone. The only way, and the simplest, to avoid such conditions, is to finish the panels before sawing them, rubbing included. You then have a nice flat well rubbed surface fully equal to the rest of the case. As these panels are only 3/16 of an inch thick it is quite easy to saw at least four of them at one time.

The method in use, which is quite satisfactory in results, is to lay four panels together, having a piece of ordinary drafting paper between them, face up. On top of the bunch have a thin piece of basswood on which the pattern is marked. These are all nailed together securely, the boring done, and then they are ready for the saw. On account of the edges of the panels going at least ¼ of an inch into the frame rabbet, the driving of small wire nails into the same is no harm, and as many nails as are necessary can be driven into the cut-out portions. It is quite feasible to dispense with the piece of basswood mentioned, and simply do your marking on the back of the top panel, which in that case will be face down when nailed.

This latter plan will depend on the kind of jig saw you have, as it would not do to tear the edges of the saw cuts, which is more likely to happen when cutting the top panel face down. The writer uses both methods and would only use the latter one, but some designs are not reversible; that is, the top panel being turned face down will not be the same as the lower ones, which are face up when sawn; for instance, a design having such a thing as a monogram in the centre. As can be easily understood these panels come out crisp and clean from the saws, the edges are sharp, the surface flat and clean.

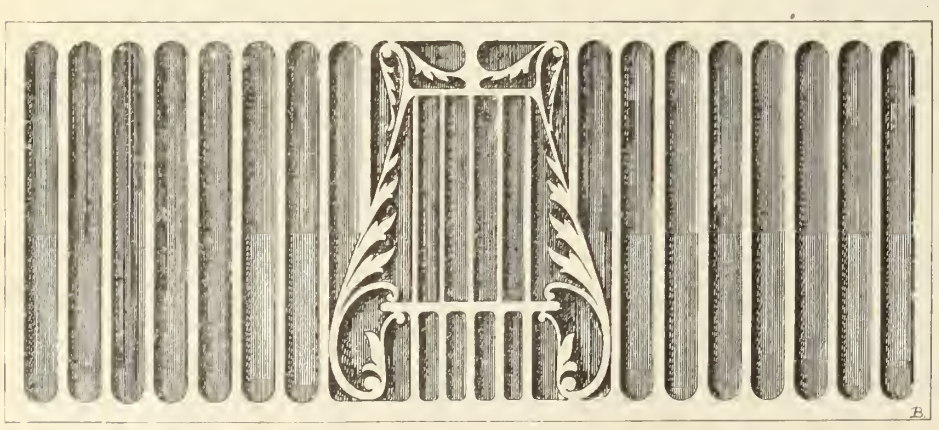


Fig. 1—This design is hard to saw.

The panels are dipped in stain, which colors the sawn edges. These edges on the top of the fret which show when in the case are shellaced and varnished, from the back, using a small soft brush, being careful to keep the varnish from smearing through the fret. If any should by chance do so rub it off, and when the work is dry go lightly over the face with a small piece of rubbing felt that has been used with oil and pumice stone.

This method is much cheaper in the end than attempting the finishing of work which has been sawn in the white. It is almost an impossibility to rub the surface of a piece of fret work and produce a good job; the cost of it would be prohibitive. An exception might be made in the case of panels that are to have fumed finish, but the finish first method is the better way. A poorly sawn and poorly finished fret panel will mar the finest case, as the eye first catches the decorative panel and the effect is either pleasing or otherwise.

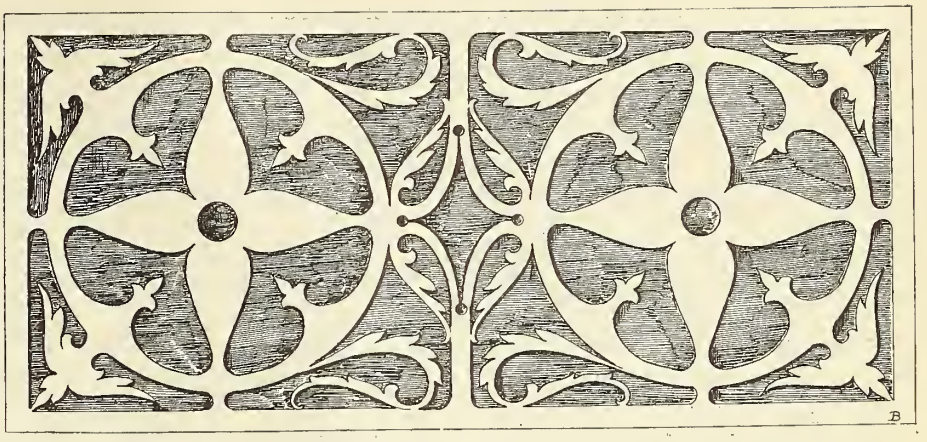


Fig. 2—An easy pattern to cut.

The jig scroll saw is a machine that has not been in such general use in furniture factories as to make it a serious consideration as to its capacity and quality of work until quite lately; in fact many furniture factories did not have one. There are several types of these machines manufactured, but they resolve themselves into two classes, the one that has the saw strained from the top in the shape of a bow or spring, and the one that runs perfectly free without any such attachment. The former is the old type, so far as the idea of a compensating spring is concerned. This machine is open to the objection that it takes considerable time to change the saw from one cut-out to another, the saws having to be provided with a metal pin through each end which is hooked into a grip below and above the table, the saw being completely removed when changing from one cut-out to another. The rate of speed is limited by the action of the top spring, it being quite apparent that the saw cannot be operated faster than the top tension will stand. The only advantage of this type machine is that it can handle very long material, as the top part of the ma-

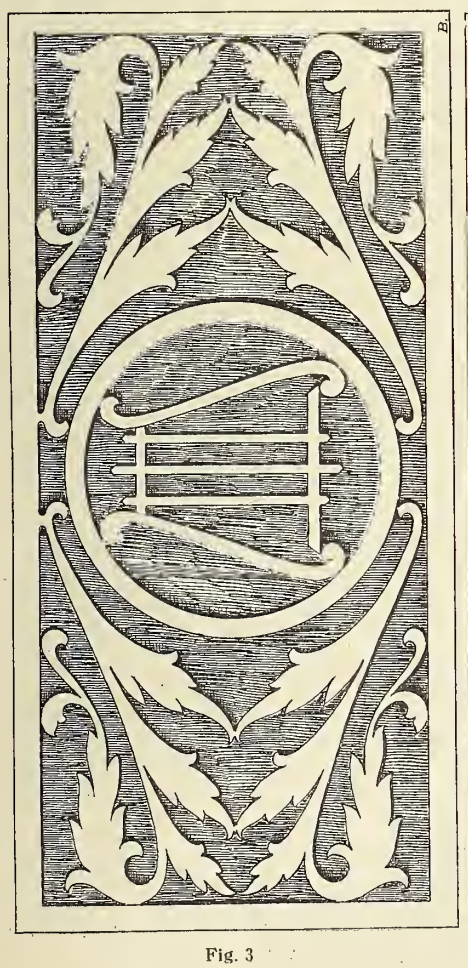


Fig. 3

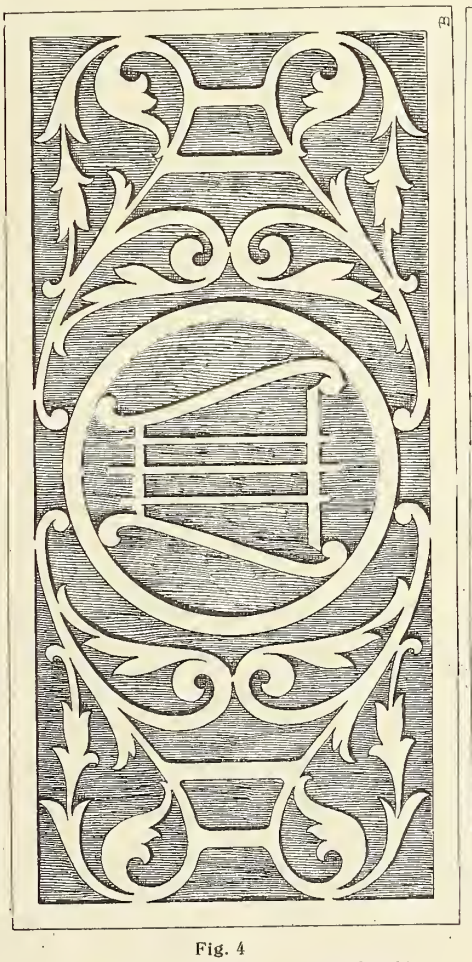


Fig. 4

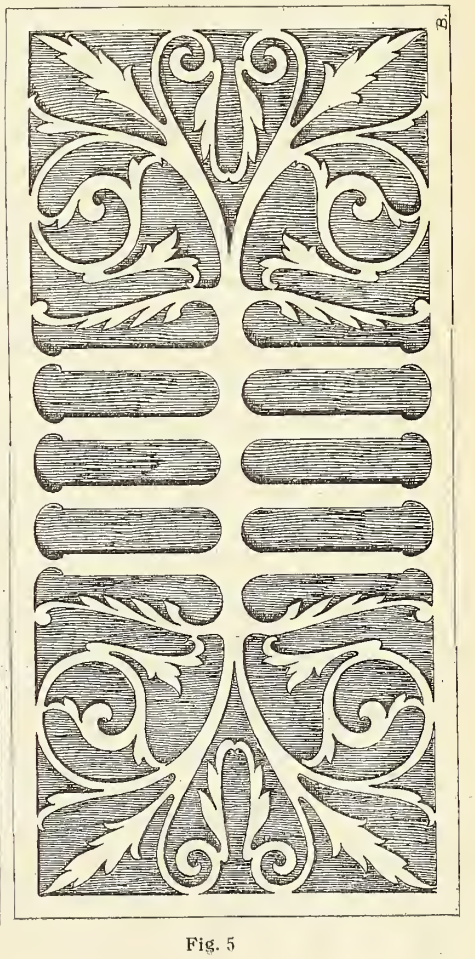


Fig. 5

Ornamental fret panels for phonograph cabinets.

chine is suspended from the ceiling. Such a point would be more of an advantage in planing mill or interior work factories than in furniture plants.

The other type of fret saw is provided with a set screw grip that holds the saw at the lower end only, the top part of the machine swinging back so as to allow shifting from one cut-out to another, the saw remaining fixed and the work being brought down over it, the arm is swung into place and "away you go." This machine has a sweeping arm that curves over the table which carries the swinging top saw guide, and has a length of about 22 inches from the saw blade to the stationary arm, which is quite enough for most work and is certainly ample for phonograph panels.

The speed of the saw is 1600 per minute, with an inch and a half stroke, and is very economical in the use of saws, it being possible to get the greatest amount of service from the blades, and to wear them down to one-sixteenth of an inch in width. The writer has known dozens of saw blades to be simply worn out, a break never occurring, and when such does happen it is always down near the grip below the table, and the saw being long enough is simply refastened, as it is possible to jig saw one-inch stock with a saw six inches long. The high speed combined with a proper saw blade produces very smooth work.

A chilled steel block with a groove cut in it to take the back thrust of the saw, inserted between the movable slides which are dovetailed into and across the table, coupled with the guides in the swinging head, keep the saw right up squarely at the work and makes it possible to do a perfect job. This machine has many points to recommend it where quality and quantity of good work are required.

Referring to the drawings of fret panels shown, Fig. 1 is a simple enough design, but is what might be called a hard one to saw, as there is nothing so hard to saw on a fret as a straight line. Such a pattern, in the marking, should have the straight lines marked with a square and a knife point, as such a line is much easier to follow than a pencil mark. The rounded ends are bored with a bit the full size of the openings. The centre of the panel is a very conventionalized lyre form, and the whole effect should be fairly pleasing if well executed.

Fig. 2 is quite different, and while looking more ornamental, is not so hard to saw, neither is it so good a design.

Fig. 3 should look fairly good, being careful with the centre ornament, the rest is easy sawing.

Fig. 4 has the same centre as Fig. 3, but the arrangement of the rest of the panel is better than Fig. 3 and gives a more pleasing result.

Fig. 5 is still another pattern, and has a stiffer line and effect and is not, in itself, so good as any of the others, though when considering the panels by themselves, it makes a deal of difference when they are put into a case that harmonizes with the respective designs, or vice versa.

It is always a good thing to be able to criticize your own work, by trying to look at it in the light of the other fellow, who is sure to make some remarks, either for better or worse. The purely geometrical forms in fretwork are rather tiresome, as they have been used so much, and the writer is of the opinion that a more decorative treatment is quite allowable, and hopes that some will agree with this statement.

New Books for Woodworkers

The Kiln Drying of Lumber

Manufacturers, superintendents, foremen and others interested in the manufacturing of lumber into finished products will undoubtedly be glad to learn that an authoritative book on the subject of kiln-drying has recently been placed on the market. The author of the book is H. D. Tiemann, M.E., M.F., in charge Section of Timber Physics and the Kiln Drying Experiments of the United States Forest Service.

In his book Mr. Tiemann has dealt with the subject in a thorough and comprehensive manner. A large number of illustrations help to make the text more easily understood. The book covers: the structures and properties of wood; Common Practices in Drying; How Wood Dries; Shrinkage, Warping, Case-Hardening; the Principles of Kiln Drying; the Circulation and Method of Piling; special problems in drying; the improved water spray humidity regulated dry kiln; drying by superheated steam and at pressures other than atmospheric; theoretical considerations and calculations, humidity, evaporation, density, the drying cycle, amount of air and heat required, thermal efficiency; effort of different methods of drying upon the strength and the hygroscopicity of wood; instruments useful in dry kiln work, the methods of testing wood; temperatures and humidities for drying various kinds of lumber; humidity diagram.

The book is published by the J. B. Lippincott Company, of Philadelphia, Pa., and is sold at $4 net.

Seasoning of Wood

The D. Van Nostrand Company, 25 Park Place, New York, are the publishers of a book, under the above title. The author of the book is Mr. Jos. B. Wagner, who is also the author of "Cooperage." The book commences with the characteristics and structures, and properties of wood, and leads up to the various methods of handling it in piling, kiln drying, etc.

The hard and soft-woods are very fully dealt with The grain, color and weight of each is given, together with the weight of kiln dried samples of the different species. The enemies of wood—timber beetles, etc., are dealt with, and numerous illustrations show the destruction that can be caused to timber by these insects.

The kiln drying of wood is gone into in a very thorough manner and a description of the various types of kilns given. These kilns are illustrated so that the reader is able to see very clearly how they work. Dry kiln accessories such as cars, thermometers and instruments for testing for moisture, etc., are illustrated and their uses explained. The price of the book is $3.00.

The Complete Woodworker

This is the title of a book recently published by Cassell & Company, Limited, 55 Bay Street, Toronto. It deals in a very thorough manner with all the woodworking tools and the methods of using them. The book takes its readers through a graduated course of lessons in the art and practice of working in wood, including sawing, planing, chiselling, boring, making of joints, trimming, veneering, inlaying, etc. Carcase building, and table and drawer making is also dealt with.

Altogether the book deals in a very thorough and comprehensive manner with the subject of woodworking and will make a valuable addition to the library of any woodworker. The price of the book is $2 and it can be obtained from the publishers, whose address is given above.

Upholstering and Trimming

Manufacturers of Upholstered Furniture Meet

The 14th semi-annual meeting of the National Association of Upholstered Furniture Manufacturers was held at the Biltmore Hotel, New York City, recently. The attendance was the most representative in the history of the Association, manufacturers being present from many distant points.

The president, Mr. C. A. O'Connor, opened the meeting with a brief address in which he stressed three points of stability in organization, viz., thorough organization, co-operative action and honesty. He called attention to the fact that the Upholsterers' Association was a part of the Federation of the Furniture Industries, including all of the leading manufacturers in the United States. He also called attention to the value of good relations with the retailers.

Secretary Maltby referred to the unusual activities of the past six months, which had been largely occupied with attention to labor matters at several different points, and he also spoke of the good results which have followed close co-operation on the part of manufacturers. He also presented plans whereby greater efficiency and quicker results will follow these further actions when needed.

Large savings were reported as resulting from buying collectively in certain commodities. The secretary stressed the matter of close relation with the sources of supply, and urged members not to overlook that the supply of material is one of the most important factors of manufacturing, and that he should be treated not as a burglar who is after their treasure, but one who is most essential to their business.

The matter of traffic received much of his attention, especially in the case of the proposed advances on parlor frames where in the changes planned by the railroads, if they had gone into effect, would have localized the shipment of parlor frames to a point wherein it would have been impossible for shipments to be made to any considerable distance.

The work of cost finding on the association method continues, and is evidenced by the large number of firms who have purchased supplies during the year, not less than thirty firms having renewed their orders for standard forms carried by the association for its members.

In closing, Mr. Maltby quoted a New York man who made a statement of so great value that it should be repeated, viz., that "each manufacturer, instead of endeavoring to build up a little flower garden around his own factory, should break down fences and endeavor to make a splendid park."

The most interesting topic to most delegates was opened by the address of Louis E. Pierson, chairman of the board of the Irving National Bank, on "Trade Acceptance." In a thoroughly prepared address he brought out the fact that emphasis had been placed upon the trade acceptance due to conditions brought about by the war, and, while more remains to be developed, in his opinion, the acceptance has landed—"has gone over the top."

He presented, among the various strong arguments for the acceptance, that it melts frozen book accounts. This perhaps alone would be sufficient reason for the cordial support of every upholstered furniture manufacturer.

In his recitation of the development of the acceptance he recited the work of the Credit Men's Association; also the statements of English, Canadian, and French bankers who have visited the United States and who have come in contact with the antiquated commercial credit machinery there, that the old system of open accounts was ridiculous in the extreme.

Probably the most significant efforts being made at this time are those of the National Chamber of Commerce, who at its recent war counsel at Atlantic City, passed strong resolutions and recommended that a committee be appointed by the Chamber of Commerce of the United States to form a board which has since developed into "American Trade Acceptance Council."

He named the three opponents of the acceptance as the well-intentioned individual who is not fully informed, the individual who is not willing to give up unearned advantages of years gone by, and the individual who is unwilling to pay his debts with the promptness which is recognized by good business the world over.

In the program which has been mapped out by this council three great national organizations will work together, viz., Chamber of Commerce of the United States, with its 1,000 affiliated commercial bodies; American Bankers' Association, representing 18,000 banks; and the National Association of Credit Men, probably in closer touch with particular conditions in which the acceptance is related and equipped to treat the acceptance in a manner which leaves nothing to be desired.

This council will carry on a campaign of education which will support the salesman who may fear that he may lose customers by adoption of this new and more vigorous method of doing business. Upon the traveling salesmen will depend much of the success of this method, and he will be able to show that buyers' credit will be greatly improved and consequent advantages would commonly accrue.

The most spirited discussion followed from the floor of the convention. One delegate produced invoice form already used by a leading house in the Middle West, which stated the utmost satisfaction in the handling of this method and testimony to the very large proportion of accounts which were paid promptly.

Discussion was closed by motion, seconded, and unanimously carried that the whole matter be referred to the executive committee for recommendation and proper action from the secretary's office.

The subject of "Returned Goods" received attention, and after recitation of the difficulty encountered along this line, Mr. Bather, counsel and secretary of the Federation of Furniture Manufacturers, stated that he acted in a legal capacity in a number of cases where

great injustice had been done by the return of furniture after a long time had elapsed since the sale. He urged the manufacturers to stand by their rights; that where goods were sold f.o.b. factory, immediately upon leaving point of shipment they become the property of the buyer, and, as such, the manufacturer had no further responsibility. The accommodations offered by the manufacturer had been abused to a very great extent, and this should not be further tolerated.

E. W. Schultz, president of the State Board of Wisconsin on Vocational Education, told of the big results which had followed the instruction of boys for the furniture trade. This undoubtedly is the source of biggest help in these times, when so many are leaving their benches to go to the front.

The convention wound up by separating into two sections—one of those interested in parlor goods and the other in sofa or davenport bed industry. These were well attended and productive of much good, as it was possible for delegates to get down closer to their own particular problems than in the larger sessions.

Entertainment features were most lavish, New York manufacturers, and especially supply houses, all trying to outdo themselves in making the pleasure of the delegates complete. A large proportion of the delegates were accompanied by their wives, and these were well taken care of by special trips to the shops and other points of interest. Among the events included in this attractive program were a theatre party at the Hippodrome and afterwards supper as the guests of the New York furniture manufacturers and a beefsteak dinner and cabaret at Healy's, as the guests of the supply men. On Thursday afternoon the party was taken on a yacht trip around Manhattan Island, and very exceptional opportunity was given for viewing the wonders of New York City, which is of particular interest at this time on account of the large number of foreign ships which were in Hudson River, and a very close view was secured from the yacht.

Altogether a new standard or record was established in many ways, and those from far distances felt, without exception, that their time and money had been well spent.

Living Room Furniture Superseding Parlor Suites

The question was put to several furniture manufacturers recently as to whether "parlor suites" were still popular with the buying public. The general opinion seems to be that although considerable business is still done in parlor sets the volume of trade has not increased in proportion to other lines of furniture. The number of parlor sets sold now is about the same as it was fifteen years ago.

Undoubtedly the reason for this is the popularity of the living room in preference to the parlor. Living room furniture has developed a remarkable popularity during the last few years. One retail furniture dealer puts it this way: "A parlor suite in the home of a working man is an investment that does not pay dividends. It is all right for friend wife's lady callers to sit on the edge of a parlor chair. They might rumple their good clothes if they sat on anything else. But where the man comes home tired from his day's work the real home should contain a living room. A man can sink back into the depths of a roomy leather upholstered chair and be at peace with the world. He does not need to worry about soiling the upholstery as he would with the ordinary parlor set. He can hang his legs over the arm of the chair if he feels like it."

This retailer says this is the line of talk he uses when a man and his wife or even the woman alone comes into his store to buy parlor furniture. He says that some people, of course, come to buy a parlor set and you can't change them in their ideas. They have dreamed for years probably of owning a parlor set like "Mrs. Jones,'" and they don't want anything else. In a case of this kind the retailer says he does not try to talk people out of buying what they want.

Another retailer interviewed said he thought the largest sales of parlor suites were made in country towns. He says that, of course, some city people prefer them to living room furniture, but the latter is making converts all the time. This dealer says that where a man and his wife come in the store to buy furniture of this kind the man nearly always falls for the talk about comfort. And he says strange to say, wifey does not have much say when hub gets this in his mind. Apparently she hasn't the heart.

On the whole it seems that what we know as parlor furniture is fast being crowded out by the modern comfortable living room furniture. Of the latter that upholstered in leather undoubtedly has the largest sale. It is serviceable, not being easily soiled, and will wear for years.

Advertising Economy

Address of H. F. Cleland at the Convention of Associated Advertising Clubs of America.

We assert for the business press a very high efficiency per dollar of cost: And these are the reasons:

1. The editorial character of each paper limits its circulation to those men in an industry or trade who are responsible for results. These are the men who actually buy or recommend the buying of the machinery or merchandise advertised in the paper. Therefore, waste circulation practically does not exist, and is in every event "cut to the bone." Hence, at the very beginning, we strike at effective advertising's greatest extravagance—waste circulation—and put in its place intensive circulation.

2. The buying power per subscriber represents an infinitely greater sum than the buying power per subscriber of any other class of publication, because each buyer purchases for business and not private consumption.

3. The editorial contents of the paper are in harmony with its advertising pages. The first tells a man "how," and the second shows "what with." To borrow the simile of a colleague of mine, the whole paper may be regarded as an enormous advertisement, with the editorial pages carrying the educational copy, and the advertising pages representing the return coupon.

The buying power per subscription in a business paper is greater than the buying power per subscription of any other medium, because things are bought for business and not private consumption.

Directions for Putting On a Wax Finish

An old finish that is "coming back" is that of waxing. Wax finish is easily applied. It will not stand wetting, but is easily repaired. Old-timers used to make wax polish by "cutting" beeswax with turpentine. Quick drying and hardening waxes can now be purchased from manufacturers of finishing materials. These waxes require a smooth surface and a very thin application for successful results. Too much wax upon a rough surface will produce ugly, white, chalky spotting as the wax dries. These are particularly noticeable on dark finishes. Black colored waxes overcome this, but these are not needed if the ordinary wax is properly applied.

In finishing with wax the following directions should be followed: Stain the wood if a very dark finish is desired. If wood to be finished is coarse grained put on two coats of paste filler and rub it off carefully, so that a smooth surface may be prepared. Allow the stain twelve hours in which to dry, also each coat of filler. Using a soft cloth, apply as thin a coat of wax as possible, but be careful to cover the wood. Allow this to stand five or ten minutes, then rub briskly with a soft dry cloth to polish. After this coat has stood for one hour another may be applied in the same manner.

Finishes for Coarse-grained Woods

An egg shell gloss may be obtained as follows: One coat of water stain, according to the color required. Allow this to dry, then sandpaper lightly with fine sandpaper. This is to smooth the grain and to bring up the high lights by removing stain from some of the wood. Use No. 00 sandpaper and hold it on the finger tips. Apply a second coat of the stain diluted about one-half with water.

This will throw the grain into still higher relief and thus produce a still greater contrast. Apply this coat of stain very sparingly, using rag. If this stain should raise the grain, rub again lightly with fine worn sandpaper, just enough to smooth. When this has dried, put on a light coat of thin shellac. The shellac is put on before the filler, so that it will prevent the highlights—the solid parts of wood—from being discolored by the stain in the filler, thus causing a muddy effect.

The shellac being thin, it does not interfere with the filler's entering the pores of the open grain. The next operation is to sand lightly with fine sandpaper. Then fill with paste filler colored to match the stain. Cover this with a coat of orange shellac. This coat of shellac can be omitted but another coat of varnish must be added. Sandpaper lightly, apply two or three coats of varnish, rubbing the first coats with haircloth or curled hair and the last with powdered pumice stone and crude oil or linseed oil.

For a dull finish a dead surface is obtained by rubbing the varnish, after it has become bone dry, with powdered pumice stone and water, using a piece of rubbing felt. Rub until the surface is smooth and even, being careful not to cut through.

A polished finish is obtained by rubbing the last coat first with powdered pumice and water and then with rotten stone and water. For a piano finish rub further with a mixture of oil and a little powdered pumice, using a soft felt or flannel. A rotary motion is generally used and the mixture is often rubbed with the bare hand. For a gloss finish the last coat is not rubbed at all.

Patching

It very often happens that in rubbing with pumice the varnish is cut through so that the bare wood shows. To patch a spot of bare wood like this proceed as follows: Sandpaper the bare place lightly with fine paper, No. 00, to smooth the grain of the wood raised by the pumice water. If the wood has been stained or filled, color the spot to match the rest of the finish. Apply a little with a cloth and wipe off clean. When this has dried, carefully apply a thin coat of varnish to the bare wood. Draw it out beyond the bare wood a little, "feathering" it so that there shall not be a ridge.

Allow this to dry hard and apply a second coat, feathering it beyond the surface covered by the first coat. Repeat until the required thickness has been obtained. Rub with pumice and water. Rub lightly, using a little pumice and much water. The slightly raised rings made by the lapping of one coat upon another will need special attention. It is best not to sandpaper between coats, because of the danger of scratching the rubbed finish adjoining the patch.

The Varnish Dry-Kiln

The process of kiln-drying varnish some time ago passed through its experimental stages, and is now recognized as a necessary part of their equipment by the furniture and instrument manufacturers of the country, says Veneers. It is a fact well known among finishers, that varnishes differ in body and drying qualities to a certain extent; therefore, when a kiln is installed the characteristics of the finish preferred by the buyer are studied and the correct degree of temperature and humidity recommended for that particular finish.

All of the air flowing into the drying-room passes through a fine spray of water, which not only removes all particles of dust from the air, but also provides it with the proper amount of humidity, and the conditioned air is discharged into the drying room in sufficient volume to do the required work.

According to the kiln manufacturers, temperature in varnish drying is not particularly important, as the heat in itself is not a very active oxidizing agent. They claim that the air at 105 degrees oxidizes the varnish, or dries it almost as fast as air at 120 degrees, there

being a difference of only about 5 per cent. in the drying efficiency between the two temperatures, and the saving in heat units is all in favor of the lower temperature. The veneered work is also safer, as at that temperature it is unaffected.

The principal service of a varnish-drying system is to produce a given quantity of perfectly clean, pure air at a definite temperature and humidity, it, of course, being understood that different kinds of work require different conditions and volumes of air, these conditions being easily controlled by the operator.

Priming Woodwork

This does not receive the care and attention it merits, and is left too often to a laborer, who applies the knotting and paint anyhow, says a writer in the Decorators' and Painters' Magazine. A good job will never result if the priming is not satisfactory.

First, dust the work and knot the knots and resinous parts. Little knotting suffices, and after being applied with the brush, should be spread with the finger tip, which saves time in glasspapering afterwards. If the work is to be finished white or ivory, white spirit should be used instead of brown spirit knotting.

The priming coat should neither be too round nor too thin, but of such a consistency as will form a good ground for glasspapering, stopping, and facing up. The white lead should be thinned out with three parts raw linseed oil and one part turpentine, with a modicum of driers. The older the oil the better, as a lesser quantity of driers will suffice.

Boiled oil should never be used in priming. Raw oil, being limpid, penetrates the woodwork less or more, according to the facility with which it is absorbed; and, when dry, thus far hardens the surface. But boiled oil, being more unctuous and viscid, forms only a thin film, or, if it penetrates at all, it does not go deep enough.

Should the priming be prepared from zinc oxide, the same remarks apply—except as regards the driers, which should be leadless or liquid.

Priming should never contain red lead. It is absolutely unnecessary. From some works the writer has seen joinery arrive on jobs primed with red lead alone. If the finish is to be white, ivory white, or other pale hue, the priming of such work with paint in which red lead is incorporated, even in a small degree, proves fatal to a satisfactory completion. In the course of time the red lead penetrates and shows itself clearly through the after-coats—no matter how many or whether the priming has been prepared from white lead, zinc oxide, or lithopone. This penetrating, technically termed "bleeding," can only be prevented by using one or other of the various "doctorings" to kill the red lead, Duresco thinned out with petrifying liquid (not water) being one of the many and one of the best "cures."

The introduction of red lead into priming has frequently caused trouble between a decorator and his client, and proved an expensive matter to the former when "bleeding" occurred.

Assuming, then, the priming contained neither boiled oil nor red lead, and the work has been allowed sufficient time to properly harden, the next process is the rubbing down, stopping, and facing up.

The flat and moulded surfaces should be made as smooth as glass, taking care not to cut or break through the priming. Thoroughly dust the work, press the stopping well into all nail or brad heads, corners, and defective parts of mouldings, and face up all imperfections on flat and moulded surfaces, flushing or levelling off nicely with the knife and leaving no superfluous stopping on the work.

White lead, with dried whiting and a little varnish to harden it, prepared on the stiff side, forms a good stopping for this purpose. Some firms also supply stopping and filling ready for use.

White lead stopping containing varnish should be placed in a kettle and covered with water, which keeps it always in a workable condition. On ogees, beads, and some other sections of mouldings, if the knife fails to level the stopping properly, use the finger tip. All the glasspapering, stopping, facing up, and making good defects should be done between the priming and the following coat, so that between the second and third and following coats no further stopping may be required.

The stopping, etc., between the priming and following coats constitutes a very important part of the work, and, while it always involves time, it is much more economical in the end to execute it as described, instead of always leaving some of it to be done between the after-coats.

A minimum of glasspapering may be permissible in some cases, but given brushes and color in good working order there is no reason why a skilled workman, who knows how to "feather his brush," should not be able to lay off a smooth finish.

Important Changes in Finishes

Among the shifting scenes in industry brought about by war conditions there is noticeable some important changes in the matter of wood finishes, writes "Wood Turning." These changes are matters of moment, too, for handle manufacturers and wood turners generally, and it is well to get informed upon them.

The main line of change seems to be from shellac to the use of varnish gums in combination with alcohol for finishes.

In the main finishes for handles and wood turnings in the past have consisted of either shellac or paraffin in various combinations. Shellac is perhaps the most widely used finishing material. The trouble with shellac is that it has gone very high in price and caused a casting about for substitutes. Just why the price has gone up is not easy to explain for the quantity being imported is somewhat larger than usual. Evidently shellac is entering into war necessities in one way and another. Any way the price is high and varnish makers and other compounders of finishes are making changes.

A number of important varnish manufacturers have brought out finishes of the varnish class which are not varnish but are varnish gums cut in alcohol. It seems that varnish gums are more plentiful than some of the oils they have used heretofore, and shellac is so scarce and high that it has inspired a sort of general turning to varnish gums and alcohol.

Some use wood alcohol, and some denatured grain alcohol. The experts say that the grain alcohol is better in that it will dry quicker and thus do less raising of the grain of the wood. However, where wood alcohol is enough cheaper to make it a point worth while it seems to serve practically as well.

Just to what extent it is practical to bleach varnish gums and furnish a white or colorless finish in these remains to be seen. It should be practically as easy as to bleach shellac itself. Of course, where white

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"The Stains Made With Brains"

The Marietta Paint & Color Co., Marietta, Ohio

finishes are not desired the coloring in the gums will not matter so much.

Broadly speaking, oils and colored gums darken wood in finishing. For example, in finishing white hickory to retain the whiteness of the wood, one should avoid oil finishes and use either a bleached shellac in alcohol or bleached varnish gums in alcohol.

It will perhaps be found eventually that varnish gums will serve our needs very well. Also there is some indication of a development in connection with rosin gums. That is the native rosin that may play a part in the future.

The important thing is this:—Finishes are undergoing changes because of the scarcity and high price in certain materials and it will pay to keep in close touch with the manufacturers and jobbers in finishes that you may be informed on what new things are offering and what possibilities they hold for you. There is a chance not only to economize in your finish as compared to what you might have to pay, but in the rounds you may be able to find a finish that will serve your purpose better. So look into the matter and be informed.

Cherry Still Available

Cherry, that excellent cabinet wood which many thought a thing of the past, is still available, and perhaps in larger quantities and sizes than generally believed. A correspondent was reminded of this recently, for while in the rounds among the hardwood consuming industry a car of cherry had just been unloaded which appeared to be from large timber. A closer examination showed boards as wide as 16 and 20 inches, and a fine lot of cherry generally. The plant was manufacturing oak and parquetry flooring, and enquiry brought out the information that it was also using about a carload of cherry a month, and found it more satisfactory in some respects than mahogany and walnut. The cherry was being treated in a vulcanizer, and was used for strips in making up borders, and it seems to serve both the purpose of black walnut and mahogany. It is an excellent wood—easily seasoned and, when seasoned, holds its shape well. The only question heard about it during the past decade was that of the scarcity. The supply is limited, but there is evidence that cherry is still available, and, perhaps as was the case with walnut, we may find that there is more cherry timber in the country than even those informed in the trade think there is, and, under proper encouragement, lots of it may be forthcoming during the next season or two.—Hardwood Record.

While a belt sander is an absolute necessity in a chair factory, the man who uses the machine must be the sort that does his work well and has the knack of getting it done quickly. He must be quick with his hands and his movements must be free and easy as he sands an edge or a corner or a curved surface.

Look about you. The men who have the largest success are those who have gone about their work, no matter what it may have happened to be, cheerfully and with a firm determination to do what they set out originally to do. Is there any reason why any one of us should not do the very same thing?

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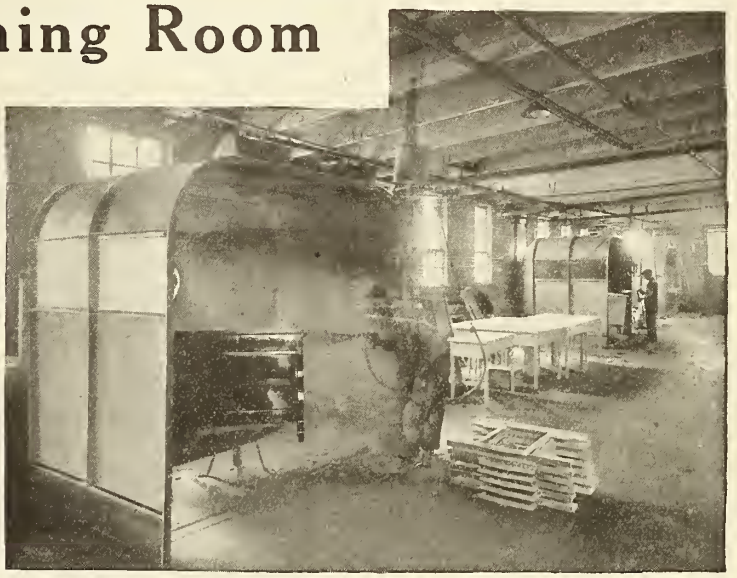

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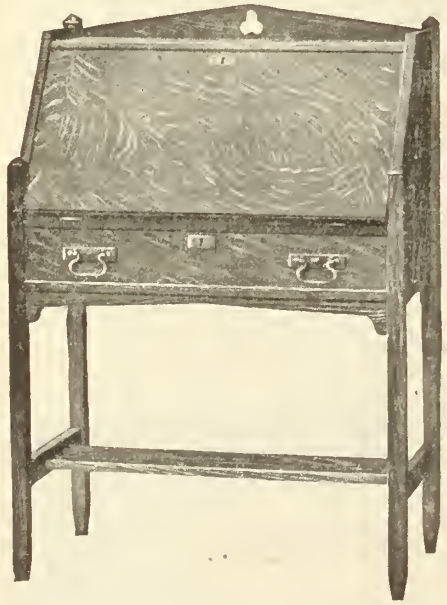

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Veneers and Panels

Buying Veneers "On Call"

This is a practice that has developed to such proportions that it seriously affects both buyers and sellers of veneers. There are several factors that may have contributed to this condition. When the veneer salesman calls on a buyer he may have a log that the buyer particularly desires and is unable to handle immediately on account of being stocked up. He may ask the salesman to have the log held for him till he can use it or the salesman may suggest holding it. Then there are other instances where travellers press the customer for a sale, offering to hold the veneer till it is called for just so they can get the order on their books.

The majority of veneer firms are willing to give service to the buyer by holding an order for thirty days or so, but it seems that a number of buyers have taken mean advantage of this willingness to give service by placing orders and forcing the veneer firms to hold the goods for periods ranging from three months to a year. In many cases, if the prices of veneers advance these buyers suddenly remember that they have some orders placed for veneers and proceed to forward shipping instructions. Then on the other hand if the prices go down they forget about the orders they have placed and simply buy their requirements where they can secure the best prices.

The fancy woods trade is the one that has suffered in this respect. It will be obvious that it would not affect the sale of plain veneers, crossbanding, etc. There would be no reason for holding material of this kind. It is, in a way, a staple commodity and can be ordered from stock any time. It is in the figured woods, sold by sample, that the temptation arises to ask the manufacturer to hold it.

Apart altogether from the unenviable position it places the veneer manufacturer in, this practice acts to the general disadvantage of the whole trade. In the first place it causes an overproduction of veneers by the creation of a false market. These veneers have to be stored until such time as they are disposed of to the consumer. Naturally the consumer eventually pays the storage charges in the price of the veneer. It will thus be seen that buying veneers "on call" hits both the buyer and seller. It hits the seller in that he does not know when his goods are actually sold and is obliged to lie out of his money for months. It affects the buyer because eventually he pays everything, warehouse charges, interest on money, insurance, etc., in the higher prices of the veneers.

We believe responsible buyers would not seek to transact business on this basis. But there is little doubt that a much better situation would be created between producers and consumers if each knew exactly how the other stood. Pleasant relations between buyer and seller are really worth while striving for and we believe veneer buyers will be quick to realize the disadvantages accruing to themselves as well as the sellers in the buying of veneers "on call."

The views of some responsible veneer firms are given below:—

No. 1.—This is a custom that has prevailed for a long time with a large majority of the veneer manufacturers, but it is now confined practically to the fancy woods trade, such as the imported woods, walnut, etc. There has been a tendency in the past year or two for them to decline business of that sort on account of the rise in values, and customers buying up such large blocks of their stock which they did not order in, thus preventing their making sales. It is a custom that this company ceased two years ago, and while we lost some business by it, yet we feel that we made it up by being able to take advantage of the higher values later on. On the other hand, when values decline, the customer does not order in the stock and it is altogether a one-sided proposition.

We have in our warehouse at this time a carload of walnut that we have sold to a dealer and received our money for same, but our customer cannot move it because he has it sold "on call," and his customers are not calling for it, so therefore, he is paying us warehouse charges on account of the delay.

The practice mentioned is one that must be eliminated on account of the rapidly increasing expenses of every sort that are being put on the manufacturer, and we certainly thank you for giving this matter publicity at this time.

No. 2.—Referring to the subject of veneer purchases and orders placed, shipment of which is to be made at a later date or, when specified, this is indeed a rather bad practice in our opinion, as it works out in the majority of cases, that if the market price increases, the customers always take the stock in and, if it decreases, they are more likely to cancel—if they can do so decently.

We have never made a practice of taking such orders for shipment at anything over thirty, or, at the outside, sixty days, for these very reasons, and, do not believe that many of the reputable manufacturing concerns of your country will place orders very far in advance of their requirements.

No. 3.—You certainly have touched upon a very vital spot in the veneer business. Personally, the writer has been very much opposed to the policy of selling veneers "on call," but it has been the policy of a great many users of veneers to buy that way, and I considered it a very great injustice to the manufacturers of veneer.

We had one case recently where we had sold a large piano manufacturer in the state of Michigan a bill of veneer amounting to some $1,600 or $1,800, who purchased these goods about 14 months ago, and the order was placed, shipment to be made "on call." We held these goods for over six months, and they did not order them shipped, and then we asked for shipping instructions. They put up first one excuse and then another, and finally about thirty days ago, we found it necessary to cancel the order and ask for the return of the samples.

Now we carried these goods, as stated above, for over a year, and as it was a high class lot of veneers, we would have

been able to sell them and get our money, no doubt several months ago, had it not been for the fact that they were tied up in this way.

There are also other cases where we have held stocks for many months, and even now we have considerable stock that is being held on orders of this kind, and goodness only knows when we will get shipping instructions, and I am sure all veneer manufacturers would be very happy if this condition could be eliminated.

No. 4.—As a rule the veneer salesman "knows his man"; if he hasn't gotten this knowledge through personal experience he has got it from his office—which is supposed to know all things—or from other salesmen, among whom there is a freemasonry which goes far in giving friendly tips to each other. So, before he goes in to talk with Mr. Smith or Mr. Jones about looking over his line of veneer samples he knows quite well what is going to be the stand taken by Mr. Smith and Mr. Jones in the matter of terms of sale. You know Mr. Smith and Mr. Jones used to take a "stand" in that respect, in about this manner: "Those are my terms, and if you don't like them you needn't book the order," and the order was usually booked. Of course, those were days, and not so far back either, when the buyer had the "whip hand," when there were so many stocks of veneer being offered to him that he could take advantage of the situation and dictate terms, delivery, and most anything else he wanted.

To a wise salesman, and most of them are "wise," this was an inconsequential matter; he simply added to his general average price an eighth of a cent, or a quarter of a cent, or a half a cent a foot before giving Mr. Smith or Mr. Jones the prices. And when he sent in the order he wrote his firm that while the terms or manner of delivery was not exactly good business, on the other hand the prices in the order covered interest charges, freight, and all the other little things that Mr. Smith or Mr. Jones thought he was getting for nothing. So in the matter of net return it was good business for the salesman and his house.

It is doubtful if there would be any change in this condition if veneer stocks had continued large, and if the banks were as willing as before to finance these long-drawn-out operations, but the elimination of these factors has brought a "right about face," and the buyer of veneer finds it good policy to give first class reasons for terms other than usual. And the veneer manufacturer finds his bank looks upon him with better favor as he shortens his line of customer paper. It is all working out nicely, and a year or two from now we will wonder at the foolishness of anyone who will think that veneer should be sold on different terms or conditions than glue, or sandpaper, or hardware, or any other commodity.

No. 5.—The sale of veneers "on call" is pernicious because it encourages over-production, and places the veneer manufacturer absolutely in the hands of, and under the control of the buyer. Besides, it is highly speculative; if the market goes down the goods are never "called." If the market goes up, the manufacturer holds the bag and loses his earnings, because having carried the veneers he has virtually earned the advance, but he does not get it. This really is a serious proposition, and is working great hardships upon the veneer manufacturer.

We are given to understand distinctly that if we do not carry our veneer accounts open on the books for from eight months to one year without a whimper that we will offend the buyer, then we can't get his business, and that seems to me to be a rotten policy.

People cannot buy steel or leather on those terms, and it is so unreasonable, unfair and highly speculative, that it is dangerous. We ourselves have been granting the terms and have consented in some instances to sell "on call," but this latter proposition is one that gets our "goat," and we cannot do it any more.

We have one account that we have carried a lot of veneers for during the past year, and still they will not let us make shipment.

No. 6.—The writer has spent a great many years selling figured wood and this was, during that time, a very common custom. In other words, the competition on figured woods was so keen that the salesman made it a practice to try to get the buyers to make a selection of figured wood with the understanding that they would crate and hold them until such time as the factory might order them in.

It certainly developed into one of the most pernicious systems that could be imagined and worked a very severe hardship on the manufacturers, from the reason that if the market became quiet or prices would fall, the veneers would not be ordered, but in case of a rising market the stock would be ordered immediately. At the present time we are not manufacturing any figured wood, therefore we do not come in contact with this system in our particular business here.

No. 7.—We understand the system used to be carried out in connection with the veneer business, but we think it is dropping off now, owing to the fact that veneer houses are now finding it much harder to get supplies, and with the demand probably better than it has been for some years. This, of course, allows them to be a little more independent, and we do not think many houses would allow their salesmen to book much good saleable stock on the old conditions "on call."

No. 8.—We think the villainous practice that you refer to was worked only in connection with figured veneers, such as mahogany, figured walnut and the like. We do not handle stock of that kind to any extent and so are not familiar with the conditions at the present time.

Certainly we would not care to sell veneers of any kind "on call" without having the length of time positively stated that we were to hold the stock and in any event we would not hold it over sixty days.

Laminated Wood and Airplanes

When the United States entered the war the need for wood to build airplanes quickly created a difficult problem. Most of the air-seasoned wood available had been bought for airplanes for the allied nations abroad, writes the Furniture Manufacturer and Artisan. Thorough air-seasoning of such stock requires from one to three years, according to the size and kind of wood. Kiln-dried stock, under the methods ordinarily used, has frequently proven unsatisfactory, and for that reason airplane manufacturers have been reluctant to use it. If the needs of the fighting forces were to be met adequately and without prolonged delay, it was essential that methods of conditioning should be available in which full confidence could be placed.

Long before this situation developed, the Forest Products Laboratory, Madison, Wis., had been making a scientific study of the drying of wood, and had developed a method of drying which has been very successful with all the woods tried. Several kilns have been built at the laboratory for experimental purposes and a number of demonstrations made in commercial kilns. Ash and spruce are the woods most in demand for airplane construction, and, anticipating the present

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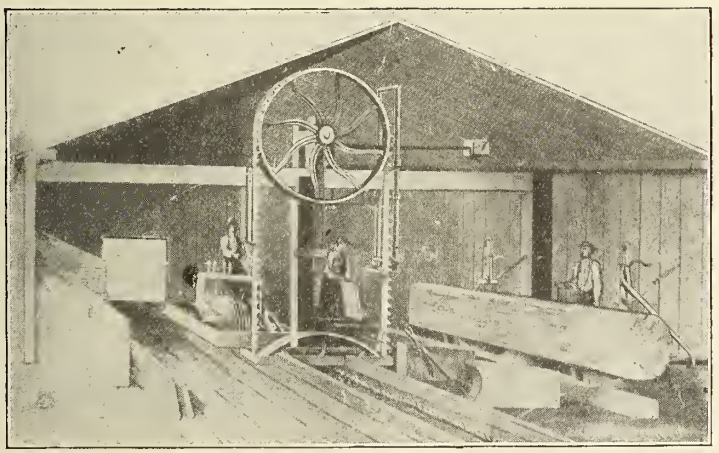

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situation, the Forest Service secured a shipment of partially air-seasoned ash and spruce plank for preliminary tests.

This material was kiln-dried without injury. Later thoroughly green Sitka spruce, white ash, white oak, Douglas fir, Western white pine, and mahogany were secured in the log for testing. The spruce and ash logs were cut up and the green material from each species divided into three matched groups. One group of each species was tested green, another will be tested air-dried, and the third was kiln-dried and then tested. Only the results of tests on the spruce have so far been analyzed. Comparison with standard tests which have already been made shows that Sitka spruce can be kiln-dried from the green condition with no more—perhaps less—injury to its mechanical properties than by air-seasoning.

These tests are of especial value, in that they help answer the question of whether speed can be attained in the manufacture of airplanes in this country, which is of importance when considering the probability of a sufficient number of airplanes being made in the United States before next spring to make an effective assault upon the central powers.

While these tests are being made, and while the uncertainty of a sufficient supply of spruce, etc., is troubling airplane makers, the Haskell Manufacturing Company, Ludington, Mich., is helping solve the problem. That built up veneer panels can take the place of any wood now being used in airplane construction has been proven by this company to the complete satisfaction of the Curtiss Airplane Company at Buffalo, N.Y., where tests have been made. So well satisfied is the Curtiss Company with the Haskell panels that it has given that company an order that cannot be filled within two years.

The Haskell Company is located in a large plant formerly used for the manufacture of pianos. It is 60 by 300 feet, three storeys high, brick, of mill construction. Last spring the owner, Mr. Haskell, commenced the manufacture of canoes from three-ply veneer, redwood centre, with two plies of birch. He is the inventor of a waterproof glue—a very secret combination that defies all efforts to separate the parts, even under the most severe boiling tests. When the opportunity to take over a Curtiss contract came, Mr. Haskell sought capital in Detroit, and the entire outfit—waterproof glue and all—was taken over by a new company.

The company is now employing fifty men, and new machinery is being installed. The plant was to be ready about December 1. The company expect that to work to capacity they will require 400 employees, and will turn out 100,000 feet of panels daily.

The company points to the fact that with spruce growing scarce in quantity, and birch panels being lighter and stronger, the demand for the Haskell built-up stock will be enormous. It can be used, and is now being used, for all parts of an airplane where wood is used at all except for the propeller blades, and it may yet be used there. The company's own waterproof glue is the first, and, it is claimed, the only glue on the market which will permit a three-ply veneer to be bent into a compound curve without yielding, which makes it especially adaptable to the uses of airplane making. It lends itself nicely to the making of hydroplanes, pontoons, etc.

The company's largest panels are 6 by 21½ feet, three-sixths thickness, but most of its work is on specification. General Manager Hibbard feels that it would be impractical to undertake to make airplanes in the average furniture factory for the reason that the whole plant would have to be revamped, receiving equipment that would permit the handling of longer stock than ever gets into a furniture factory. Often the spans on wings of a plane are 35 feet long. By the time the average furniture plant was well equipped for airplane making, says Mr. Hibbard, the war will be well over.

The Curtiss Company is not the first to make airplanes of laminated wood. Recent reports from the war zone are to the effect that some German airplanes captured by the French and English were made of veneered stock, and were much lighter in weight than the machines in general use.

Veneer Men to Meet in Chicago

The National Veneer and Panel Manufacturers' Association held their annual meeting in the Auditorium Hotel, Chicago, on December 11th. At the time of going to press the details of the meeting have not come to hand, but the programme as arranged indicated that some very interesting topics would be discussed.

It is stated that the exigencies of the war will curtail the output of many veneer consuming products, such as non-essentials, but that a tremendous demand has been created for veneers and panels for airplane parts and ammunition boxes. Mr. B. W. Lord was to make a full report at the meeting regarding the investigations of a committee that went to Washington, D.C., to confer with the authorities. Recommendations were to be made for swinging the veneer industry to the new products with as little confusion and loss as possible.

It is planned by the veneer and panel men to offer the United States Government the entire facilities of all plants connected with the Association, both as a proof of patriotism and so as to create as little disturbance as possible in the trade. It is expected that the efforts of the Association will be met more than half way by the Government, because the Government realizes that business must be maintained in a flourishing condition so as to preserve the commercial structure of the country and to provide the sinews of war.

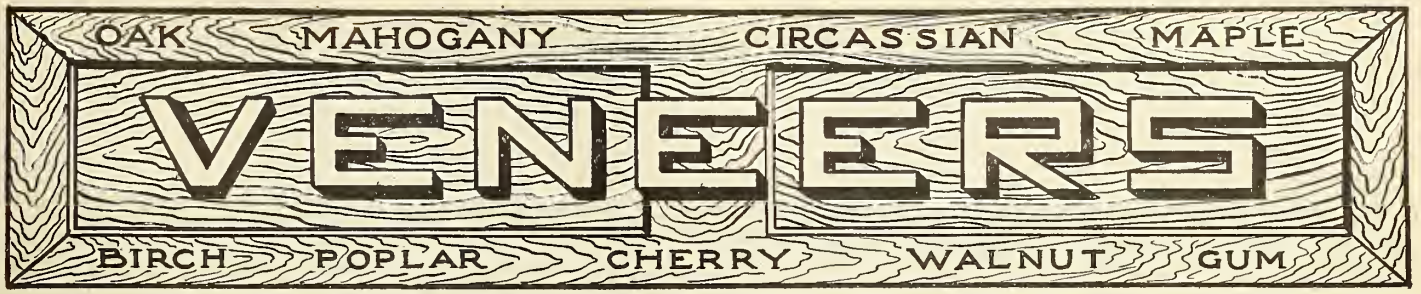
The result of tests and experiments in glueing and drying veneers for airplane work were to be given out by Mr. Hicks, of the Forest Products Laboratories, Madison, Wis.

Arrangements were made for addresses to be delivered before the members of the Association on a number of timely subjects. These included: "How Manufacturers are Facing War Problems," by Mr. Saunders, of the Simonds Mfg. Company; "Uniform Cost Systems," by Mr. Flint, of the Millwork Cost Information Bureau; "Grinding," by Mr. Brunner.

The Committee on Grading Rules were to make report to the meeting. This report should be of interest to all users of veneers. The details will be published in our next issue.

Victory Bonds for Employees

Mr. T. L. Hay, General Manager of Hay & Company, Limited, has bought Victory Bonds for three of the company's employees, W. H. Budd, Wm. Henderson and Theo. Hawn, each of whom has completed fifty years with the company.



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Grand Rapids

Table Men Meet

The Central Bureau of Extension Dining Table Manufacturers met for its twenty-seventh mass meeting and thirteenth annual convention, at the Auditorium Hotel, Chicago, in October. Forty-one manufacturers were present.

The commissioner's report on a recent canvass as to whether salesmen's commissions were based on net or gross amount of shipment created interesting discussion, and various points were developed. It was generally held that salesmen should be favored and encouraged. Many credited commissions on gross sales, where no more than cash discount terms were made and also credited mail orders from direct customers.

Commissioner Wulpi's charted report on the table trade barometer was of prime interest, and gave a thorough view of the movement of this line on "Monthly Orders Booked," "Shipments Made," and "Business Carried Over" to the succeeding month. This is a feature which, at the meeting in Washington a year ago, it was determined to install, and members freely expressed themselves that the value of this information alone repaid them for all association expense. Thorough and hearty co-operation by all members was assured.

The Thursday morning session was opened with addresses by Federation Traffic Manager C. S. Bather and his assistant, L. E. Golden. These gentlemen made a review of the work of the Furniture Federation, the work in the traffic department, and explained the present status of the freight classification on dining tables. Members were agreed that the value of the work done in this department well paid all in the expense in federation membership.

Under "Shots on Table Topics" several subjects were discussed at length, and elicited much interest. Under question box discussion a dozen subjects were handled with profit to all.

The Care of Belts

Getting the best results out of driving belts for veneer machines calls for a little extra care because of the trying conditions under which they are operated. Authorities upon the care of belts tell us that three times the adhesiveness is gained by softness and pliableness of belting over those which are dry and hard.

Also we are told that long belts, either driving horizontally or inclined, give a much better effect than vertical and short belts, but the authorities seldom give us satisfactory explanation on this point. A long horizontal or inclined belt gives elasticity and weight, both of which can be obtained on short vertical belts by the proper application of tightener pulleys.

Perhaps the main point in connection with veneer machine belts is to keep them coated or impregnated with something that will protect them from moisture and render them pliant, but not too flabby. It is a little difficult, however, to set forth this treatment in specific terms, because many ideas are worked out by different people and satisfaction is obtained through varying methods. A good idea in this connection is to confer with belting manufacturers and be largely guided by their advice, because each manufacturer understands better what is needed for his own particular belting than anyone else.—Veneers.

VENEERS

Mahogany

American Walnut

Gum

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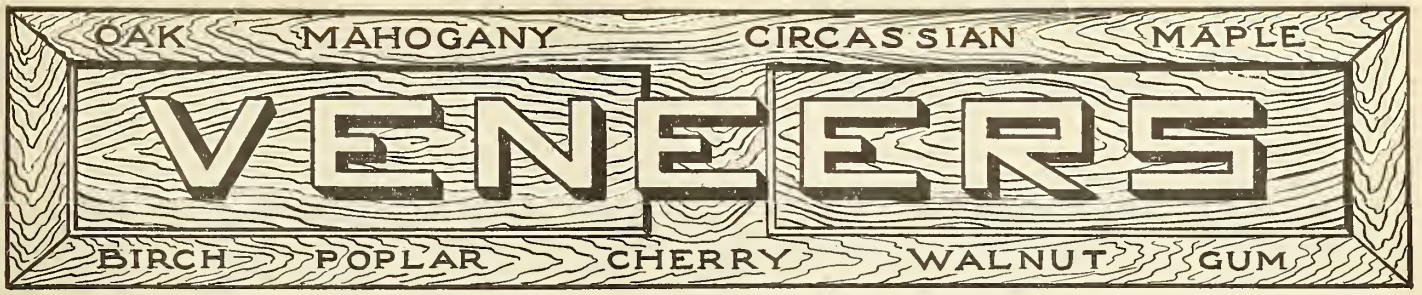

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The Lumber Market

Domestic Woods

A wholesale lumberman in Toronto who has recently made several trips into the lumber producing sections of the country states that the mills are asking from $8 to $10 per thousand more for stocks than they were asking last year. Wholesalers are, therefore, somewhat dubious about tying themselves up for the output of any of the mills at these prices. The wholesaler mentioned above feels that lumber producers are entitled to some advance over prices of last year because he fully appreciates that production costs are higher than those of last year, but he is doubtful whether the producers are justified in demanding such steep increases as $8 and $10 per thousand.

A number of prominent lumber wholesalers are inclined to believe that if they do not rush in and tie themselves up at the prices which the sawmills are at present asking, they will be able to buy the lumber at lower prices later on. The general opinion seems to be that producers are asking too much and that when they find there is no great rush to take their output off their hands at their own prices they will be reasonable.

After the New Year the producers will be able to estimate with some degree of accuracy what their logs are costing them in the woods and what their probable costs will be for sawing. They will then be in a position to tell whether they can make a reduction on the prices they are asking at present. The chances are that their costs will show them that they can make quite a material reduction and still be on the safe side.

The outlook for further shell box orders is regarded as promising. Apart from the furniture and piano industries the shell box business has no doubt accounted for the largest consumption of lumber during the past year. This business, of course, depends upon the continuity of the war, but there is every likelihood of that continuing for quite a few months at any rate.

The outlook at present for the building trades is no more promising than it has been during the last couple of years. With the exception of a few industrial plants and additions to factories and a few residences here and there, there is very little building going on. One job in Toronto that will account for the consumption of a considerable quantity of sash, doors, and interior finish is the new Union Station. The general contractor has intimated that the subcontracts for the interior work will be let shortly. That for the window frames has already been let. The general outlook, however, for the sash and door industry is not particularly encouraging. Therefore, sash and door plants will no doubt be able to make arrangements for all the lumber they require.

The reports from furniture and piano manufacturers show considerable optimism regarding the prospects for business during 1918. If conditions turn out to be as anticipated these two industries will likely be in the market for pretty large quantities of lumber. Then, of course, there are the implement factories and numerous others turning out staple lines of woodenware. The demand for lumber will, therefore, continue much as it has been during the past year. Present indications are that lumber prices will show some advances over those recently prevailing, but we do not think that manufacturers need anticipate any abnormal or unwarranted increases. The prices that will be asked in all probability be based on the costs of production with a reasonable percentage added for profit.

Imported Woods

The lumber industry of the United States is at present suffering from the car shortage. There is a continual battle to get cars to transport the logs to the mills and then the battle is even more strenuous to get cars in which to ship the lumber to the customers. Owing to this situation stocks throughout the country in the hands of manufacturers and at distributing points have dwindled to a very low level and the competition for available shipments is such that prices are maintained. Buying naturally centres about war requirements. The hardwood trade is divided sharply into two defined divisions, the war trade division and the civilian trade division.

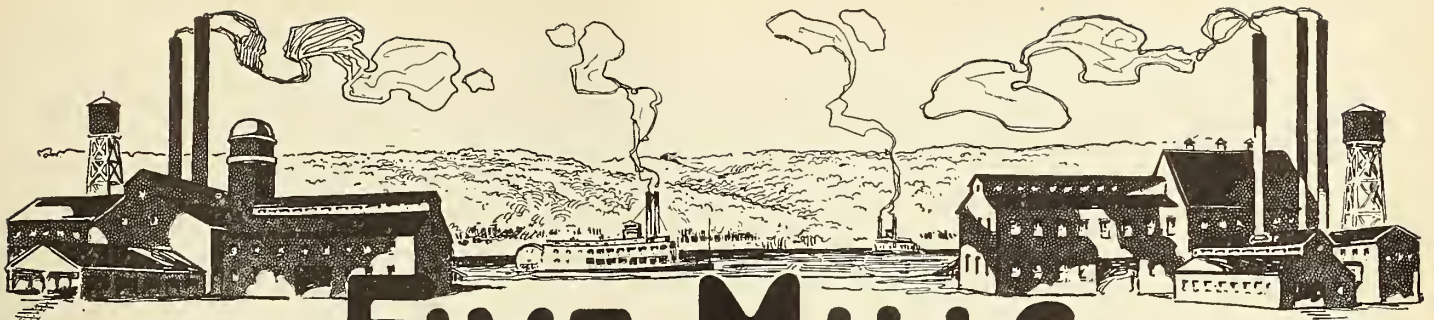
The demand for thick stocks has led manufacturers to cut up as much of this material as possible from their logs, as they realize that there will probably be a premium on this material. The result of this is that less thin stock is being cut and consequently even a moderate demand for this class of lumber is sufficient to hold the market firm. Manufacturers are making great efforts to speed up production, especially of the species needed by the War Department, but with the labor shortage growing and the increasing car shortage, the 1918 production of hardwoods is not expected to do any more than equal the 1917 cut. Some buyers are congratulating themselves because of their purchase of fall and winter supplies early in 1917.

At a recent meeting of the Northwestern Hardwood Lumbermen's Association at Minneapolis, the president, addressing the members, said in part:—"We will start 1918 with considerably less lumber in the hands of the manufacturers and wholesalers than was on hand at the beginning of 1917. Stocks have been well cleaned up with but very few exceptions. The lower grade lumber is especially very scarce and commands very high prices.

The output of lumber for 1918, to a very large extent, will depend upon labor conditions. Labor is very scarce and wages are extremely high. There is not a firm operating but what could use more men than it has, and, while seemingly there is a large number of men throughout the country, there are a great many of the "I Won't Work" class; so it is very hard to say how it will affect the production of lumber next year."

The movement of quartered oak is limited, but plain oak is being sold in rather large quantities according to some reports. Those lumber wholesalers who have birch or maple have no difficulty in disposing of it. Well informed lumbermen say that it is futile to look for a reduction in the present very lofty figures for months.

At Boston hardwoods, firsts and seconds, 1-inch, are going this week as follows: Ash, $72 to $74; basswood, $59 to $65; birch, red, $72 to $75; birch, sap, $62 to $65; maple, $60 to $62; quartered oak, $92 to $95; plain oak, $69 to $74; poplar, $70 to $73. Some demand for ash for airplanes is noted this week.



FIVE MILLS SEVENTY FIVE MILLION FEET

Rayville, La.
Vicksburg, Miss.

Madison, Ark.
Memphis, Tenn. (2)

Guarantee you an adequate and constant source of supply for

Ash, Elm, Cottonwood, Gum, Oak

Link your organization to ours—tie your factory to an establishment whose facilities and resources are so complete as always to be in a position to furnish your full requirements—let us blaze for you

AN OPEN ROAD TO YOUR BASE OF SUPPLIES

This is but the foundation upon which ATCO EXCEPTIONAL SERVICE is based; for coupled with the facilities for service is the true desire to Serve Well—to furnish you lumber of the grade and quality your particular work demands—to give you an honest return for your investment.

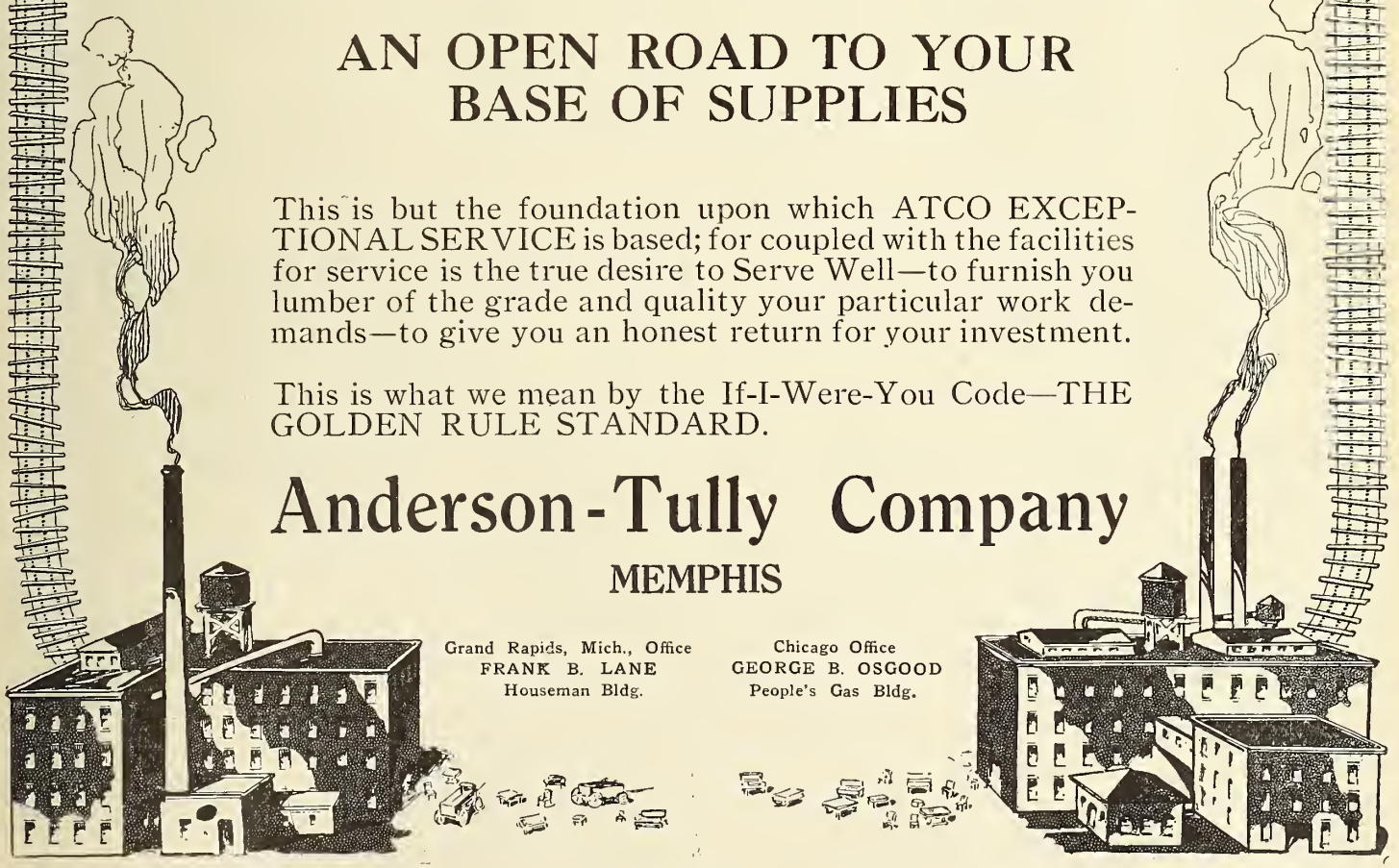
This is what we mean by the If-I-Were-You Code—THE GOLDEN RULE STANDARD.

Anderson-Tully Company

MEMPHIS

Grand Rapids, Mich., Office
FRANK B. LANE
Houseman Bldg.

Chicago Office
GEORGE B. OSGOOD
People's Gas Bldg.



New Box Specifications

The adoption of new specifications for the cubical contents of boxes is the result of a conference held last week in the Chamber of Commerce, Spokane, Wash., by fruit growers, shippers and box manufacturers of the Northwest. From these a stabilizing of the industry is expected as well as a utilization of materials that were not available under the former specifications, and box manufacturers say that the new measurements will allow them to turn out during the winter shooks of a standard size that will conform to any demand that may arise.

The new measurements will apply to the boxing and transporting of the apple, peach, pear and vegetable crops. As adopted they are:

Two ends, 11½ x 10½ x 11/16 inches; the ends may be in two pieces, with three corrugated staples at each joint.

Sides (two pieces), 19½ x 10½ x ⅜ inches, solid.

Tops and bottoms (four pieces), 19½ x 5¼ x 3/16 inches.

Cleats (four pieces), 11½ x 11/16 x ⅜ inches.

The following exceptions will be permitted in case of emergency:

Ends may be in two or three pieces. If the sides are in one piece 5/16-inch stuff may be used.

Not more than 50 per cent. of the sides may be tongued and grooved if 19½ x 10½ x ⅜ inches.

Two-piece tops may be 19½ x 5¼ x 3/16 inches.

Three-piece tops may be 19½ x 3¼ x 3/16 inches.

An estimate just announced is that under these specifications boxes for immediate delivery can now be made at an average cost of 16 cents each.

Symbols Used in Desk Factory

To save time in clerical work in writing on drawings, requisitions, stock records, time cards, etc., a large manufacturer of desks and office furniture uses symbols instead of the full names of articles. The symbols are, as far as possible, descriptive of the article, so that they can be picked out at a glance. When it is unadvisable to use descriptive symbols for fear of confusion with other similar articles symbols are chosen which are so extremely inappropriate as to be conspicuous. An example of this is the symbol X for an inkstand. Other symbols are:

H—High roll top desk.
L—Low roll top desk.
C—Special roll top desk.
S—Flat top desk.
D—Double flat top desk.
K—School-teacher's flat top desk.
DF—Double desk with one side arranged for typewriter.
PF—Flat top desk with typewriter in place of right-hand bank of drawers.
R—Roll top typewriter desk.
B—Bookcase.
RB—Revolving bookcase.
P—Coat tree.
X—Inkstand.
DX—Inkstand, double.
M—Letter tray.
MC—Map and chart case.
T—Table.
S—Umbrella stand.
W—Wardrobe.

As most of the products of this company are made with sanitary legs and with drawers to the floor, sanitary designs are indicated by the prefix of the letter O. Styles of desks or bookcases under each type are indicated by a serial number. The length in inches follows the style number. Then comes the type symbol and finally the number of the catalog (serially numbered) in which the desk is described.

One symbol, taken at random, is O3360DF8. The company state that to one who is familiar with this system it is at once apparent that this refers to a sanitary desk, style 33, sixty inches long, a double desk with one side arranged for a typewriter, described in catalog number 8.

The company say that it is not at all a complex system and that it takes only a short time to become thoroughly familiar with it. It tells all that is necessary in order to identify any product and thus prevents indefiniteness, as well as saves a great deal of time.

In laying out a system of this kind it is said that size is best expressed and most easily remembered as a numeral, and that a series of arbitrary numbers is suggestive of the relative, not the actual size. It is better where possible to use some characteristic dimension. This is more descriptive and allows the adding of new sizes in their logical order without disturbing the existing symbols. Where arbitrary numbers are assigned a sufficient number of blanks should be left to cover all future additions.

Lack of Taste in Wood Toy Design

In connection with the article in the November issue of the Canadian Woodworker on the lack of taste in the design of Canadian toys, a correspondent writes: A recent experience of mine bears out the statements in the article. I had occasion to purchase a certain toy which was formerly made abroad, and which is now being manufactured by a Canadian company. I asked the proprietor if he had such a toy. "Yes, I have," he replied, "but I cannot recommend it. I purchased a number of the goods for my last year's Christmas trade, and have most of them on my shelf. They are the ugliest goods I have ever bought, and my experience was such that I declined to stock any further goods from the manufacturers for this year's trade. The design and make were truly awful—the crudest thing I have seen for many a day. I want to encourage Canadian goods, but my experience, costing me cash, makes me wary of purchasing toys from firms new to the business and whose products are far below foreign standards. In future I shall decline to allow such firms to gain their experience at my expense. My competitors, who bought some of the goods I refer to, also got badly stuck, and, like me, have not repeated their last year's order."

John M. Pritchard, secretary of the Gum Lumber Manufacturers' Association, Memphis, Tenn., has been called to Washington to take charge of the Southern Hardwood Emergency Bureau. A number of other Memphis men have agreed to give two weeks of their time, every six weeks, to the service of the government in the important matter of purchasing and transporting the millions of feet of hardwood that will be wanted to prosecute the war against Germany.

The man who is loyal to his work is also loyal to himself; he succeeds because the best he has is always to the front.

Felger Lumber & Timber Company

Manufacturers and Wholesalers

Cuban Mahogany

We carry a complete stock of Cuban Mahogany in Grand Rapids as well as at our mill in Havana, and can make prompt shipments.

Southern Hardwoods

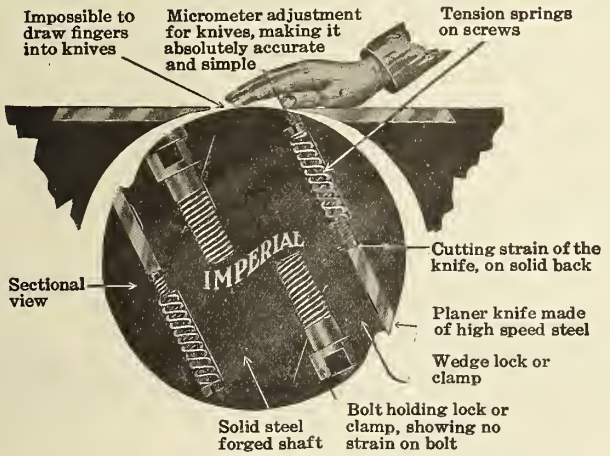
We Specialize in

Gum, Oak, Chestnut and Poplar.

Grand Rapids, Michigan

Suite 733 Michigan Trust Bldg.

IMPERIAL Round Safety Cylinder


Impossible to draw fingers into knives
Micrometer adjustment for knives, making it absolutely accurate and simple
Tension springs on screws
Sectional view
IMPERIAL
Cutting strain of the knife, on solid back
Planer knife made of high speed steel
Wedge lock or clamp
Solid steel forged shaft
Bolt holding lock or clamp, showing no strain on bolt

This circular head fits any buzz planer or jointer. It takes high-speed knives and has a micrometer adjustment. It fits so close to the table that accidents are impossible.

Imperial Machinery Co.

230 Ionia Ave. - Grand Rapids, Michigan

We offer the following DRY Hardwoods

for Prompt Sale

2 cars 4/4" No. 2 Com. and Btr. Black Ash.
3500 ft. 6/4" No. 1 Com. and Btr. Black Ash.
2 cars 4/4" No. 2 Com. and Btr. Basswood
4500 ft. 6/4" No. 2 Com. and Btr. Basswood.
2 cars 4/4" No. 3 Com. and Btr. Birch and Maple (Principally Birch)
2 cars 8/4" No. 2 Com. and Btr. Birch and Maple. (Principally Birch)
7500 ft. 4/4" Firsts and Seconds Birch.
14000 ft. 6/4" No. 1 Com. and Btr. Birch.
7100 ft. 8/4" Firsts and Seconds Birch.
7700 ft. 8/4" No. 1 Com. Birch.
3800 ft. 8/4" No. 2 Com. Birch.
1 car 6/4" and 8/4" No. 3 Com. Birch. (About 3,000 ft. 6/4")
1 car 4/4" No. 3 Com. and Btr. Soft Elm.
2 cars 8/4" No. 1 Com. and Btr. Soft Elm.
2 cars 6/4" No. 2 Com. and Btr. Hard Maple.
2 cars 8/4" No. 2 Com. and Btr. Hard Maple.
(Not over 10 per cent. No. 2 Com. in last two lots)

ABOVE STOCK ALL DRY

Graves, Bigwood & Co.

Manufacturers of

PINE, HEMLOCK, HARDWOOD } LUMBER

TORONTO OFFICE:
712 Bank of Hamilton Bldg.

MONTREAL OFFICE:
327 Coristine Bldg.

Mills at—Byng Inlet, Ont.
and
Deer Lake, Ont.

News of the Trade

James Beaton, of Sydney, N.S., has purchased the carriage building and repair business of J. A. McCallum, of Sydney.

The head office of the Northern Toys and Turning Company, Ltd., has been changed from Montreal to Maniwaki, in the County of Ottawa.

The Wad Mop Company has been incorporated at Montreal, P.Q., with capital stock of $35,000, to manufacture brushes, brooms, mops, etc.

The Three Rivers Box Company, of Three Rivers, P.Q., have awarded the sub-contracts for their factory. This plant is to cost $60,000. Mr. N. E. Clement is the manager.

The new phonographs being manufactured by the George McLagan Furniture Company at Stratford, Ont., are now on the market and are meeting with considerable success.

The Gold Medal Furniture Manufacturing Company are putting in a sawmill at their Uxbridge factory. Logs will be bought from the farmers in the territory adjoining the plant.

The pattern shop and carpenter shop at the plant of the Polson Iron Works, Ltd., Toronto, was recently destroyed by fire. The loss is about $200,000. The buildings will be re-erected at once.

The R. Laidlaw Lumber Company secured the contract for the window frames for the Toronto Union Station. The contracts for the interior woodwork of this building are expected to be let shortly by P. Lyall & Sons, the general contractors.

The manufacturing industries of Amherst, N.S., helped to roll up a big total in the recent Victory Loan campaign. Two of the woodworking firms to participate in the campaign were the Amherst Pianos, Ltd., and the Victor Woodworks,, Ltd.

The Victoria Doll and Toy Manufacturing Company, Ltd., has been formed, with a capital of $199,000, to manufacture and sell toys of all descriptions, and with power to acquire any business as a going concern. The head office is Victoriaville, P.Q.

An artificial limb factory is to be established in Regina, Sask., in the near future. This will be a branch of the main factory operated by the Military Hospitals Commission at Toronto. The purpose of the factory will be to equip returned soldiers with artificial limbs.

One of the newly-incorporated woodworking concerns in British Columbia is the Hardwood Lumber Company, Ltd. Under its incorporation this company is permitted to carry on business as sawmill and shingle mill proprietors, manufacturers of sash, doors, and all kinds of finish, etc. The capital is $15,000.

Mr. Tomlinson, of Hamilton, Ont., has been engaged by the Stratford Manufacturing Company, of Stratford, Ont., to act in the capacity of sales manager. This company have recently added a number of new articles to their line, such as folding chairs and children's furniture. They are dropping the kitchen cabinets for a time.

Heavy orders for boxes placed by Okanagan Valley, B.C., shippers of fruit and vegetables keep the plant of L. C. Smith Company, Ltd., of Vernon, B.C., in steady operation the greater part of the season. Sash and door business was light, owing to the small amount of local building and the light demand from prairie points.

The W. T. Glover Basket Company, at Freeman, Ont., has recommenced operations for the season. The factory, which under ordinary conditions employs a large staff, closed down about the first of the year on account of lack of material, but it is expected that the coming season will be one of the busiest in the history of the plant.

The planing mill owned by Wilker & Son, at Rosthern, Sask., was totally destroyed by fire. The building, together with machinery and engines, are a total loss. The building was an old frame one, and burned very quickly. A quantity of gasoline exploded in the engine-room and gave the fire a good start. No insurance was carried, but Mr. Wilker contemplates rebuilding.

The new three-storey brick factory of the Keenan Woodenware Company, of Owen Sound, in which they propose to house the refrigerator manufacturing department which they acquired about a year ago, is rapidly nearing completion. The company are moving the machinery from the plant in Toronto in which they have conducted the refrigerator business since it was purchased.

Major Austin Taylor, of Montreal, has been appointed to represent the Imperial Government in the purchase of spruce lumber for aeroplane work. Major Taylor has already reached Vancouver, and will take up his duties immediately. Before being appointed to this work Major Taylor was in charge of the Montreal Locomotive Works when they were engaged in the manufacture of munitions.

The Stratford Chair Company, of Stratford, Ont., have been installing some new equipment at their plant. This includes a new Paasche varnish and shellac sprayer, made by the Paasche Air Brush Company, of Chicago; a Rockford pneumatic rubbing machine, made by the Rockford Tool Company, of Rockford, Ill., and a Curtis air compressor. The company believe that these improvements will be a profitable investment, and will aid them to cope with the present increased cost of production.

The Bennett Lumber Co. Limited

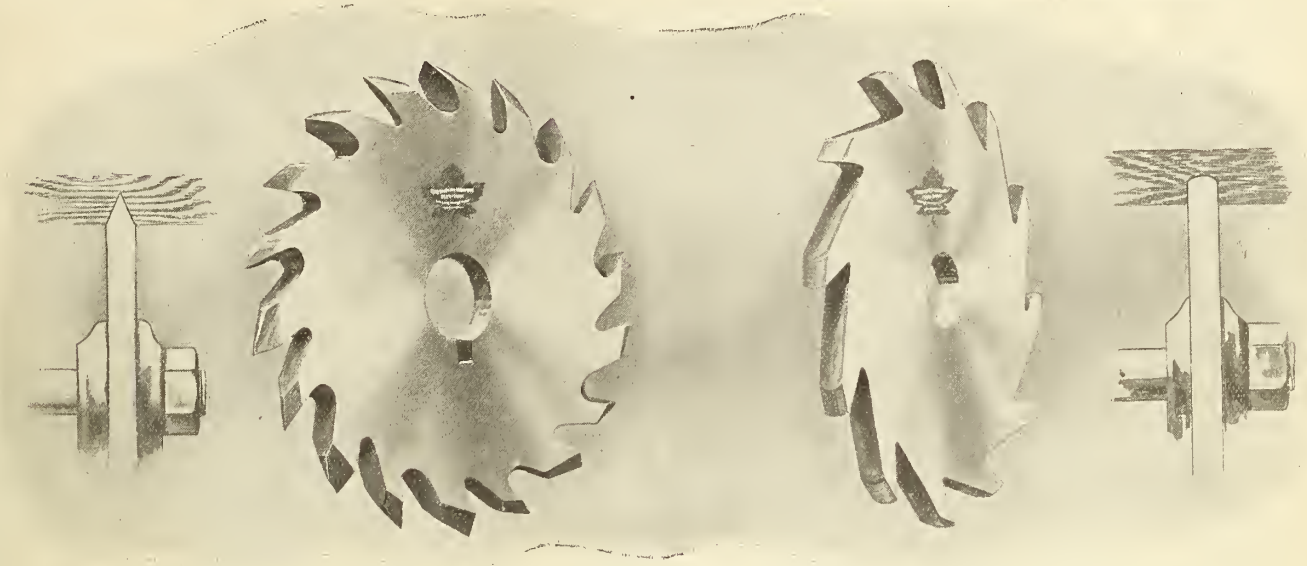
Solicit your enquiries for

Mahogany, Walnut, Oak, Poplar, Gum

and all other American HARDWOODS in all grades and thicknesses.

CANADIAN SPRUCE, PINE and BIRCH LUMBER

Long Distance Phone Main 812 — 11 St. Sacrement St. MONTREAL, P.Q.

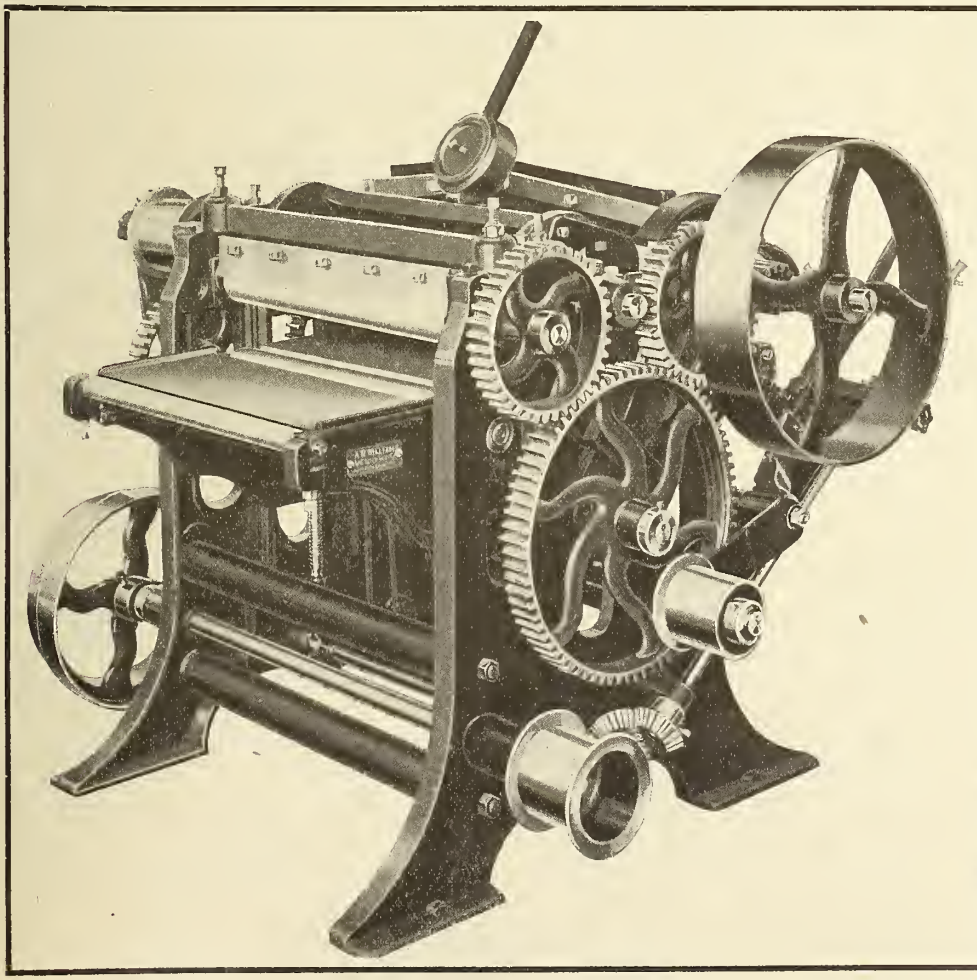


You Save Money by Buying "Maple Leaf" Saws

"Maple Leaf" Grooving Saws

We make special shaped tooth Grooving Saws for special work, round face, bevel face, shear cut, and straight face, etc. We manufacture Dado Heads, Mitre Saws, Novelty Saws, Special Tooth Grooving Saws, Rip and Cross-Cut Circular Saws, Concave Saws, Band Saws, Hand Saws, Cross-Cut Saws, etc., etc. Write for Catalogue.

Shurly-Dietrich Co., Limited, Galt, Canada Branches— Vancouver, B. C., a 306-308 Wellington St., Ottawa



The "Eclipse" SURFACE PLANER

This machine is capable of producing the highest grade of planing and is especially suitable when very thin smooth work is required.

Over 2000 in use—

A splendid testimony to the **satisfactory service** which you get when you buy an "ECLIPSE." Write for illustrated circular.

The A. R. Williams Machinery Co. Ltd.
TORONTO - CANADA

FOR SALE
BOX MACHINERY

One dovetail machine.

One setting up machine.

One four saw trimmer—self feeding, made by Dovetail Machine Co., St. Paul, Minn.

One No. 22 Box trimmer, made by Fisher Machine Works, Chicago, Ill.

All cost $3,300; will guarantee and sell at a bargain. Inquire of The Globe Soap Company, Cincinnati, Ohio. 10-12

Machinery For Sale

Acting on instructions from the assignees we have for sale the balance of the machinery equipment of a large Box Factory in Winnipeg. Also we have many other special woodworking tools to dispose of. The following is a partial list:—

4 Power Feed Rip Saws.
1 American Combination Saw and Dado Machine
1 C. M. C. Tilting Table Saw.
1 Cowan Tilting Table Saw.
1 McGregor-GourlayTilting Table Saw
2 Cowan N-255 Chain Saw Mortisers
1 New Britain No. 7 Chain Saw Mortiser.
1 New Britain No. 2 Chain Saw Mortiser.
1 Set Beach Boxmakers Saws.
1 Set Cowan Boxmakers Saws.
1 Berlin 54 in. No. 289 Band Resaw.
1 Berlin H-471 Glue Jointer
1 Outfit Band Resaw Fitting Machinery
1 Emery Grinder on Pedestal
1 Robinson Band Saw Setting Machine
1 Dowel Machine with six heads
1 Cowan Horizontal Band Resaw ((Hopper Feed)
1 Nichols Arm Sander (American)
2 Turning Lathes
1 McGregor-Gourlay 24 in. Planer and Matcher
1 McGregor-Gourlay Double Spindle Shaper
6 Sections Cowan Veneer Press 12 in. x 38 in.
1 McGregor-Gourlay 16 in. Buzz Planer
1 Cowan 24 in. Buzz Planer
1 Cowan M-210 Double Surfacer
1 Hespeler 10 ft. Belt Sander.
1 Schinnel-Reid 8 ft. Belt Sander
1 Greenlee Sash Relisher & Hollow Chisel Mortiser
1 Outfit Morgan Lock Corner Machinery
1 A.B.C. Planing Mill Exhauster and Piping, 60 in. Single
1 30 in. Single Planing Mill Exhauster
1 60 in. Double A.B.C. Planing Mill Exhauster and Piping
1 60 in. Columbia Sander
1 set Hayes Dowel Door Machinery
4 Heavy Moulders
3 Sash Stickers
1 Pony Planer
1 Upright Chisel Mortiser
1 Locomotive Boiler 25 to 30 H.P., complete with stack
1 Lighting Outfit, Engine, Generator and Panel (150 lights)
1 "Murray" Corliss 18 in. x 36 in.
1 "Atlas" Corliss 125 h.p.
2 Motors, 30 H.P., 1120 R.P.M.
Large quantity Shafting, Pulleys and Hangers.

For prices write

J. L. Neilson & Co.
Winnipeg, Man.

t.f.

Foreman Required

For woodturning establishment, capable of taking charge of Automatic and Waymoth lathes. Must be first-class production man and thoroughly understand cutting of lumber. Splendid opportunity for right party.

Box 34, Canadian Woodworker.

FOR SALE

Used Machinery in Good Running Order

Goldie & McCulloch Swing Saw.
McGregor & Gourlay Wood Shaper, 2 spindle, 48 in. square table.
Maddock Stroke Sander.
Curtis Universal Stroke Rubbing Machine, No. 218 model. Table 3 ft. by 6 ft. 6 inches. In use only sixty hours. Perfect condition.

If you can use any of these machines you will save money buying from us. For bargain prices and further particulars write

The White Sewing Machine Co. of Canada, Limited,
12-2 Guelph, Ontario.

List of Yates Used Machinery

1 Yates No. 180—30 x 6 Double Surfacer.
1 Yates No. 255 Self Feed Rip Saw.
1 C.M.C. No. 305—8" Four Side Moulder
1 Egan 30" Two Drum Sander
1 McGregor 9 x 6 QV Planer and Matcher
1 Jackson Cochrane 30 x 6 Double Surfacer
1 Connell & Dengler 60" Band Resaw
1 Ballantyne 12" Four Side Moulder
1 Jackson Cochrane 36" Three Drum Sander
1 West Side Iron Works Chain Feed Band Rip Saw
1 Automatic Saddle Seat Router
1 Jackson Cochrane No. 32—10" Three Side Moulder
1 Cowan 48" Three Drum Sander
1 C.M.C. No. 636 Mitre Saw
1 Fay Egan 42" Three Drum Sander
1 Yates No. 153—30 x 6 Single Surfacer
1 McGregor 16" Hand Jointer
1 McGregor 50" Back Knife Lathe
1 Mitts & Merrill Hog
1 Mershon Standard Perf. 54" Wheel Resaw

Prices, descriptions and full particulars on request.

P. B. YATES MACHINE CO., LTD.,
12-3 Hamilton, Ont.

WATCHMAN'S CLOCKS
Hardinge Portable
The only unlimited System.

Patrol clock, each $39.60 complete.
Stations, any number needed $4.10.
Also Key Type Clocks, limited capacity.
F.O.B. Toronto. Write for catalogues.

SIGNAL SYSTEMS, LIMITED
110 Church Street - - Toronto

PETRIE'S
DECEMBER LIST
of
NEW and USED
WOOD TOOLS
in stock for immediate delivery

Wood Planers
30" Whitney pattern surfacer.
26" double surfacer.
24" Single surfacers, various makes.
24" Champion planer and matcher.
24" Jackson-Cochrane
16" C.M.C. timber sizer.

Band Saws
54" Jackson-Cochrane re-saw.
30" Clark-Demill bracket.
30" Cowan bracket.
28" Ballantine, bracket.
26" Crescent pedestal (2).

Saw Tables
No. 2 Crescent boring attachment.
No. 3 Crescent, universal.
No. 5 Crescent, sliding top (2).
Ballantine variable power feed.
M.64 Cowan variety.
No. 257 Berlin power-feed rip.
12' Defiance automatic equalizer.
MacGregor Gourlay railway cut-off.
Greenlee automatic cross-cut.
Canadian steel frame pole saw.
5½' Crescent, swing.
8' Crescent swing.

Mortisers
Cowan hollow chisel, M190.
Galt upright, compound table.
No. 5 New Britain, chain.
No. 2 Smart foot power.

Moulders
13" Clark-Demill four-side.
12" Cowan four side.
12" Woods four-side.
10" Houston four side.
8" Dundas four-side.
7" Cowan double head.
6" Cowan four side.
6" Dundas sash sticker.

Clothespin Machinery
Humphrey No. 8 giant slab resaw.
Humphrey gang slitter.
Humphrey cylinder cutting-off machine.
Humphrey automatic lathes (6).
Humphrey double slotters (4).

Miscellaneous
Elliot universal woodworker, with motor.
12" C.M.C. drum sander.
Fay & Egan 12 spindle dovetailer.
MacGregor Gourlay 12 spindle dovetailer.
Cowan dowel machine, M80.
No. 1 Ballantine dowel machine.
Crescent post boring machine.
Egan sash and door tenoner.
Dundas double-head tenon machine.
18" Trevor box heading turner.
Cowan sash clamp, M137.
No. 4A Fox wood trimmer.
Hall's automatic shingle machine.
Dougherty horizontal shingle machine.
Waterous lath machine.
26" Dominion lath trimmer.
MacGregor-Gourlay 2-spindle shaper.
Defiance shovel handle shapers
48" 3 saw edger.
20" American wood scraper.
3" Pringle & Brodie variety wood lathe.
4-head rounding machines.
Cowan spindle carver, M63.
No. 1 Hart automatic saw filer.
No. 104 Covel band-saw roller.

Prices, Descriptions and Full Particulars on Request

H. W. PETRIE, LTD.
Front St. W., Toronto, Ont.

The Modern Veneer Tape

"Easimoov"

Patented

FOR OUTSIDE WORK OR FOR SPECIALLY CURVED WORK

A new tape which was quickly recognized by veneer users as supplying a real demand.

Holds Veneer Perfectly, yet can be removed instantly after having served its purpose, without being sanded.

Saves Time, Labor and Expense

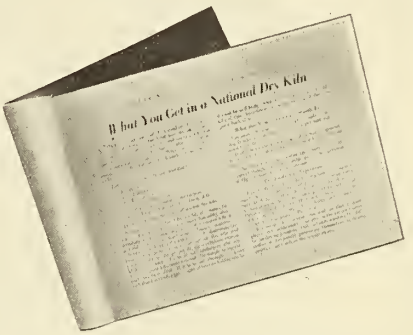
The kind of tape that pleases the operator.

IDEAL COATED PAPER CO.

Veneer Tape Specialists

Main Offices and Mills, BROOKFIELD, Mass.

A Page taken at random from a Catalog of National Dry Kilns



Here is real dry kiln information. Something worth your reading and considering---a revelation in dry kiln discussion.

A whole catalog for the asking

THE NATIONAL DRY KILN CO.

1117 East Maryland St., INDIANAPOLIS, Indiana

Plan the New Year—

Make Your Line a Leader

Furniture properly trimmed and satisfactorily castered is more readily sold.

Burns & Bassick Trimmings

add a certain distinction to any furniture which cannot be supplanted.

Diamond Velvet Casters

The Foundation of good furniture.

Supplied in all regular sizes and in any finish to order.

The Burns & Bassick Company

Division of

THE BASSICK COMPANY

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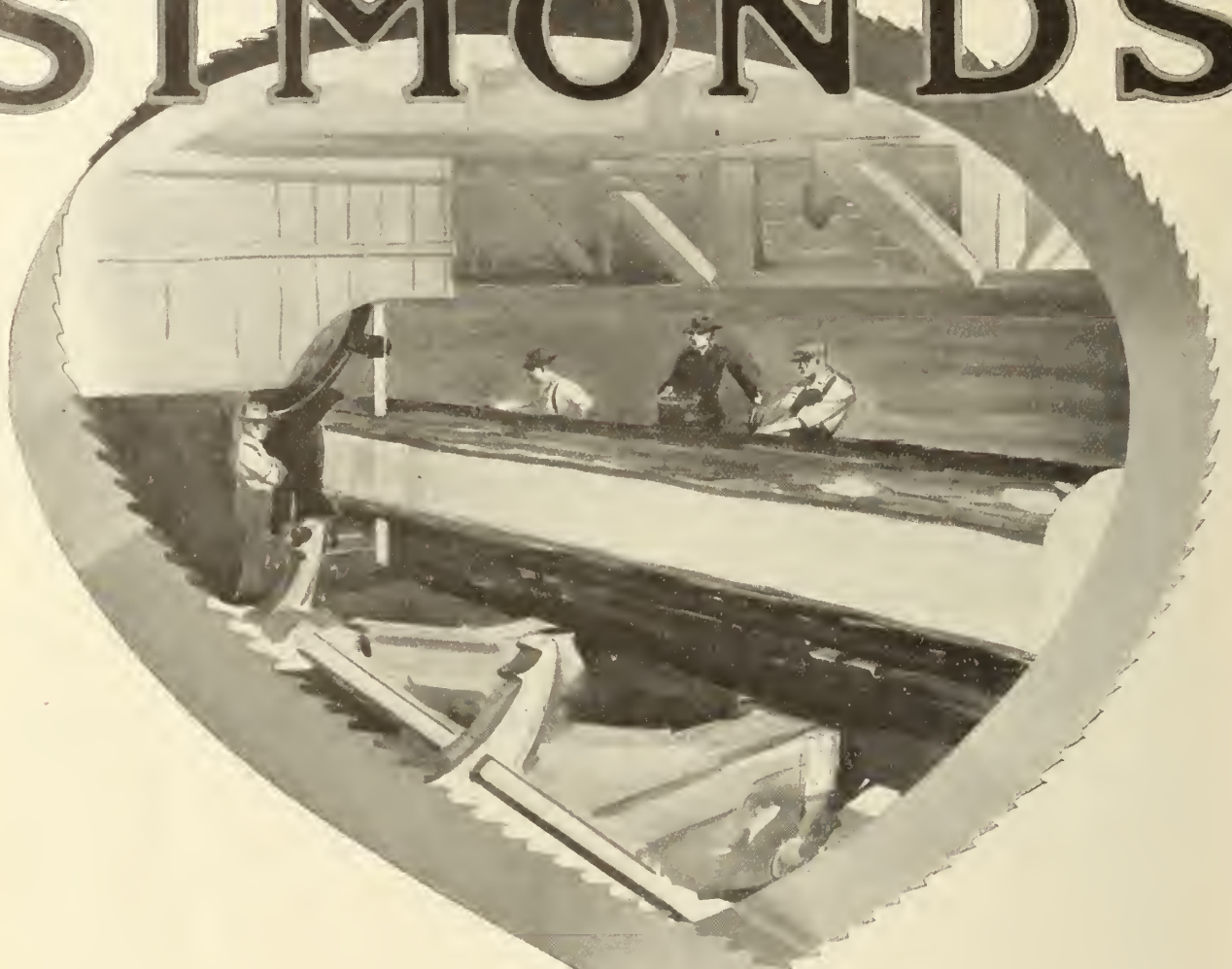
SIMONDS



Wherever Economy and Efficiency are the Rule in Saw Mills:

There you will find SIMONDS Wide Band Saws. These perfect lumber producers should be in every mill. Most big, successful mills now use them. There are good reasons why. Let us tell you when we quote on your saws.

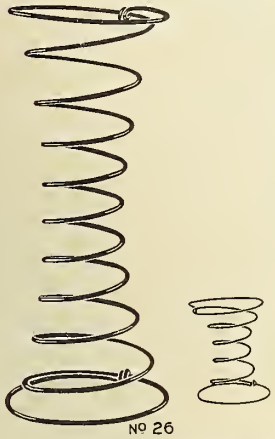
Simonds Canada Saw Co., Limited

Factory: St. Remi St. and Acorn Ave.

St. John, N. B. **Montreal** **Vancouver, B. C.**

BEST QUALITY
Upholstery Springs

from the most delicate pillow springs to the large comfortable seat springs



CANADIAN MADE FOR THE CANADIAN FURNITURE TRADE

Steele's Quality Upholstery Springs are tempered, and are guaranteed to retain their original height indefinitely. The line includes two cone springs, single cone springs with any finish on the small end, edge springs with round or square fronts, springs for loose cushions in barrel, two cone or straight compression styles, springs of special strength, knotted or plain ends.

YOUR PARTICULAR LINE

of upholstered furniture no doubt requires special springs. Refer your problems to us; our experts are at your command.

Helical Springs for Spring Bed and Mattress Fabrics

Canada's Largest Manufacturers of Wire Springs
Steel, Brass, Phosphor Bronze and Monel Metal

James Steele, Limited

Established 1885

GUELPH, ONTARIO - CANADA

E. H. Shreiner Lumber Company

EXCLUSIVELY WHOLESALE

Band Mill—West Salisbury, Pa.

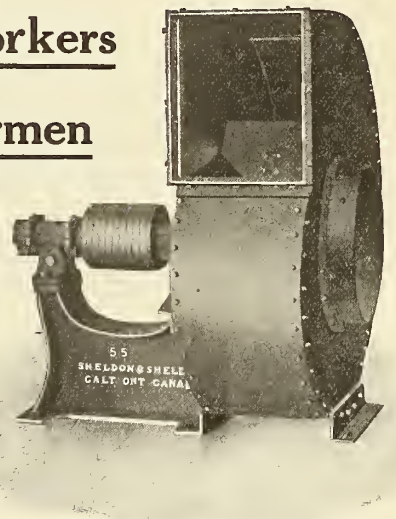
General Offices—PITTSBURGH, Pa.

5 Cars 4/4 1's and 2's Red Oak
and
10 Cars 4/4 No. 2 Common Red Oak
Band Sawn West Virginia Stock

SPECIAL

Watch this space each month for Specials.

Woodworkers and Lumbermen



The Sheldon **Exhaust Fans** have characteristics that adapt themselves to the service of the Planing Mill or Wood-working Plant. They are specially designed for this kind of work, having a saving in power and speed of 25% to 40%.

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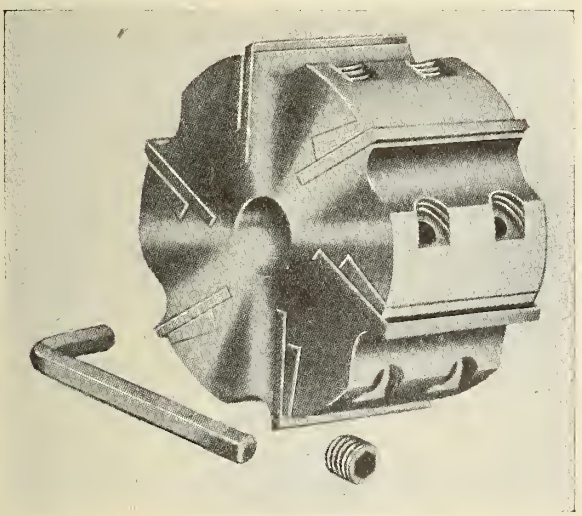
Messrs. Robt. Hamilton & Co., Ltd., Bk. of Ottawa Bldg, Vancouver, B.C.

Safety High Speed Cutter Head



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Adapted to use for top, bottom and side heads on moulding, flooring and surfacing machines.

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We can make quick delivery and guarantee quality. Write for particulars, etc.

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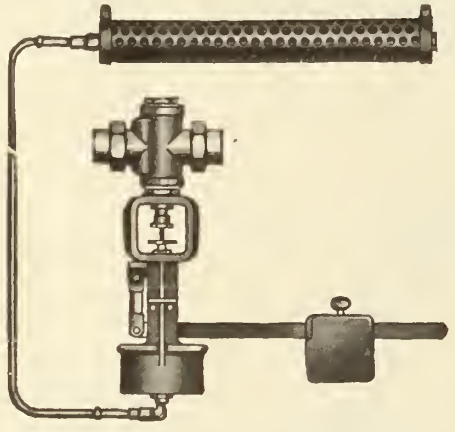
Hand control of Kiln temperatures, and humidity, results in warped and checked lumber, which means waste—(above cut is from photograph of oak planks, typical run of hand-regulated kiln.)

Automatic control of temperature and humidity results in lumber evenly and thoroughly cured, without warping or checking. (Above cut from actual photograph illustrates average results from automatically-regulated kiln.)



Powers No. 15 Regulator—Automatic and Reliable.

The Powers Regulator automatically controls temperature and saves from a quarter to a third of the time usually required for kiln drying lumber.

It regulates profits, upwards.
Try it at Our Risk.

The
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Specialists in Automatic Heat Control

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Here's what they think about it

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Dear Sirs,—

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Wishing you every success, we remain,

Yours very truly,
PEMBROKE SHOOK MILLS, LTD.
J. T. Stuart,
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Why speculate when people who know how are at your service? WRITE US.

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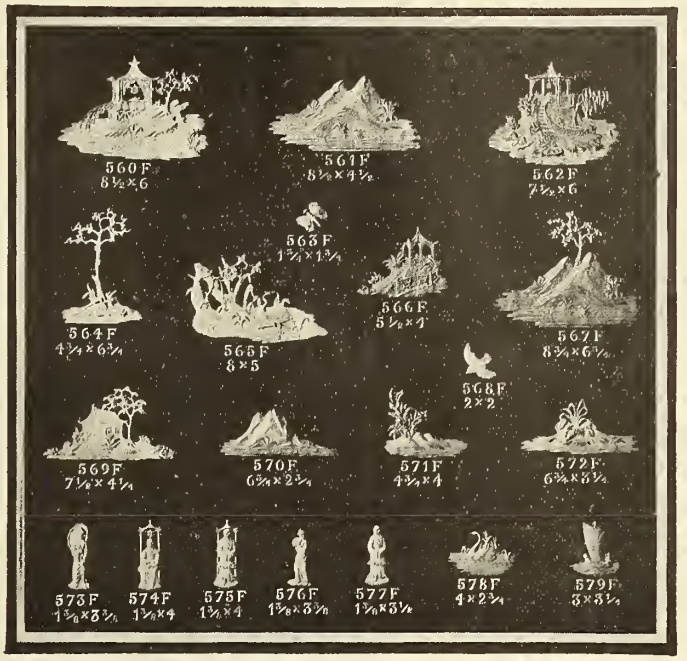
Composition Carvings

are now extensively used for furniture decorations.

This is a material that will interest all manufacturers of furniture.

Write for Catalog and prices.



Most durable and practical Carvings on the market.

We have thousands of stock designs in all the different styles; can also manufacture according to your special designs.

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THE ORIGINAL FINISH of the early English furniture, mellowed by age, is extremely beautiful. Not a little of this effect is due to the antique finish of the brass trimmings.

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Constructions for chairs, rockers, davenports and settees.

The Luxury Spring for filling of top cushions over Foster Springs or constructions is the "Ideal" combination.

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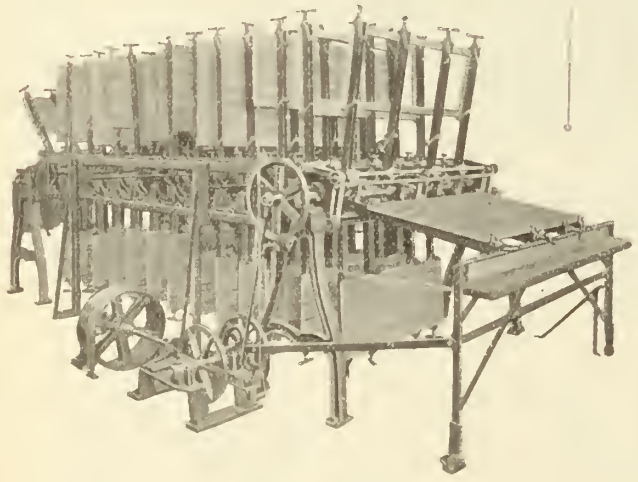

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NEW WAYMOTH WOOD-TURNING LATHE

This machine is most suitable for the production of a wide variety of turnings. In one operation it turns, bores and cuts off wood turnings in any size up to 34 inches in length.

Let us tell you more about it.

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We are the only manufacturers of portable woodworkers of this type in Canada, as the Hutchinson machine has proved to be an infringement on our patents. We are now manufacturing both machines, so can fill any want required.

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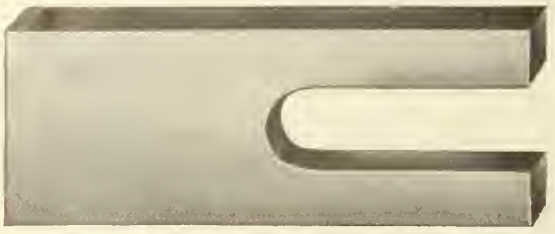

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Save 8 to 20% of fuel—

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Canadian Morehead Mfg Co.
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VAPOR DRY KILN
GRAND RAPIDS
MICHIGAN

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We would suggest that you supply our engineering department with description of your kilns and lumber drying needs, so we can understandingly outline what can be done.

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"Carpentry," by Ira S. Griffith. Published in 1916 by The Manual Arts Press. 188 pages, illustrated. Price $1.00.

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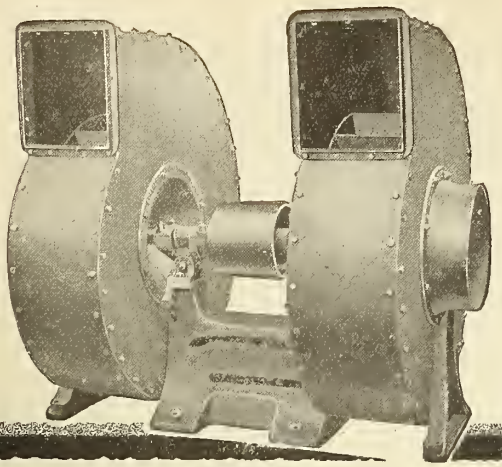
How to Join Mouldings; or, The Arts of Mitering and Coping, by Owen B. Maginnis. Published by William T. Comstock, New York. 72 pages, illustrated. Price 50c.

Utilization of Wood-Waste (Second Revised Edition), by Ernst Hubbard. Published in 1915 by Scott, Greenwood & Sons. 192 pages, illustrated. Price $1.50.

Woodworker Publishing Company, Limited
345 Adelaide Street West, Toronto, Ontario



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MILL EXHAUSTERS

require from 15 to 25 percent less power—and they are designed to handle shavings and other stringy material as well as sawdust, bark, gases, smoke, etc.
Bulletin 256-13 gives tables of speed and power requirements. May we send you a copy?

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No ladders, scaffolding, etc., are needed when these oilers are used. They induce REGULAR ATTENTION to overhead bearings. In terms of dollars and cents, not including accident costs, this means reduced friction, longer service for journals and bushings, fuller power transmission, coal saved. Can you reasonably afford to expose yourself to such accidents when the cost of this preventative is only $7.50?

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MADE-IN-CANADA

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HAMILTON CANADA

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in Your Factory over and over again, BUT—

HAVE YOU GOT THEM ?

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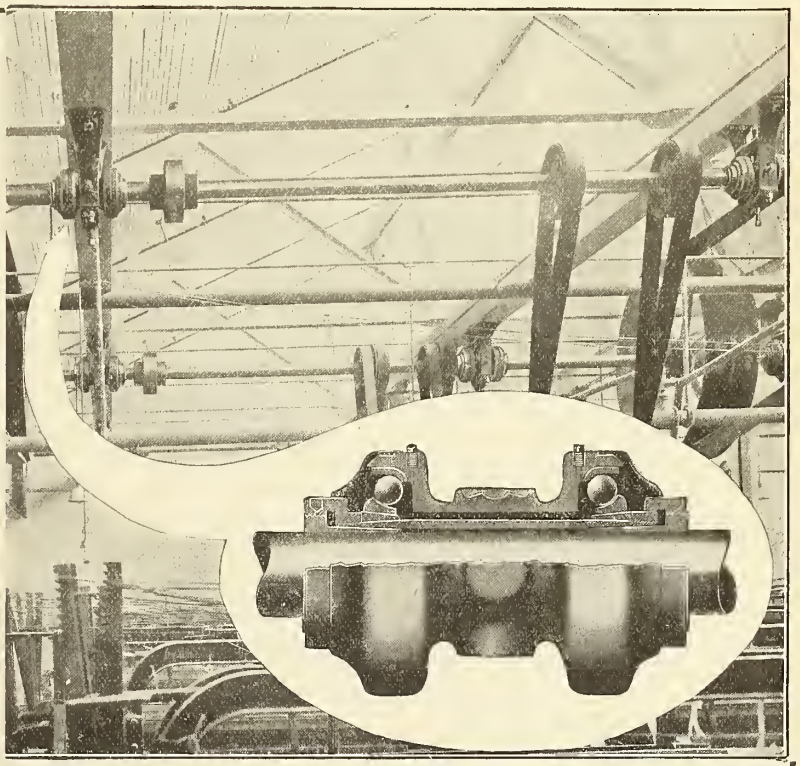

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The "Canadian Woodworker" Buyers' Directory

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Paasche Air Brush Company, Chicago, Ill.

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Canada Metal Company, Toronto, Ont.

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Chapman Double Ball Bearing Co., Toronto.

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Whitney & Son, Baxter D., Winchendon, Mass

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Yates Machine Co., P. B., Hamilton, Ont.

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Yates Machine Co., P. B., Hamilton, Ont.

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Yates Machine Co., P. B., Hamilton, Ont.

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Yates Machine Co., P. B., Hamilton, Ont.

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Garlock-Walker Machinery Co., Toronto, Ont.
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Toronto Blower Company.

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Preston Woodworking Machinery Company, Preston, Ont.
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Yates Machine Co., P. B., Hamilton, Ont.

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Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

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Garlock-Walker Machinery Co., Toronto, Ont.
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Canada Machinery Corporation, Galt, Ont.
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Neilson & Company, J. L., Winnipeg, Man.
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Preston Woodworking Machinery Company, Preston, Ont.
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Yates Machine Co., P. B., Hamilton, Ont.

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Gage Mfg. Company, E. E., Gardner, Mass.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, Beloit, Wis.
Shimer Cutter Head Co., Galt, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

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Canada Machinery Corporation, Galt, Ont.
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Jackson, Cochrane & Company, Kitchener, Ont.

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Canada Machinery Corporation, Galt, Ont.
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Grand Rapids Veneer Works, Grand Rapids, Mich.
National Dry Kiln Co., Indianapolis, Ind.
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Toronto Blower Company.

DUST SEPARATORS
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Toronto Blower Company.

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Garlock-Walker Machinery Co., Toronto, Ont
Radcliff Saw Mfg. Co., Toronto, Ont.

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Petrie, H. W., Toronto.
Williams Machinery Co., A. R., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

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Garlock-Walker Machinery Co., Toronto, Ont.
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Yates Machine Co., P. B., Hamilton, Ont.

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Williams Machinery Co., A. R., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

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are the favourite saw today with hundreds of satisfied millmen all over Canada. The reason is that we use only the best grade of cast steel made by the **crucible** process. We never use the cheaper grades of open hearth steel used by our competitors and we are sure that our great success is mainly due to this factor. **Crucible** process steel costs us a good deal more to buy but we have no "comebacks" and no broken saws.

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and a

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"Canadian Woodworker" Buyers' Directory—Continued

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Jackson, Cochrane & Company, Kitchener, Ont.
Yates Machine Co., P. B., Hamilton, Ont

GLUE SPREADERS
Fay & Egan Co., J. A., Cincinnati, Ohio
Jackson, Cochrane & Company, Kitchener, Ont.

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Billstrom, Nels. J., Rockford, Ill.
Perrin & Company, W. R., Toronto, Ont.

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Fay & Egan Co., J. A., Cincinnati, Ohio
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.

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Yates Machine Co., P. B., Hamilton, Ont.

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HARDWARE
Burns & Bassick Co., Bridgeport, Conn.
Foster, Merriam & Co., Meriden, Conn.
Laidlaw Bale-Tie Co., Hamilton, Ont.

HARDWOOD LUMBER
American Hardwood Lumber Co., St. Louis, Mo.
American Oak Mfrs.' Assn., Memphis, Tenn.
Anderson-Tully Co., Memphis, Tenn.
Atlantic Lumber Company, Toronto.
Barr-Holaday Lumber Co., Greenfield, Ohio.
Bennett Lumber Co., Montreal, Que.
Brown & Company, Geo. C., Memphis, Tenn.
Bury & Company, Robert, Toronto, Ont.
Churchill-Milton Lumber Co., Louisville, Ky.
Clark & Son, Edward, Toronto, Ont.
Felger Lumber and Timber Co., Grand Rapids, Mich.
Gayoso Lumber Company, Memphis, Tenn.
Graves, Bigwood Company, Toronto, Ont.
Kersley, Geo., Montreal, Que.
Korn-Conkling Co., Cincinnati, Ohio.
Martin-Barriss Co., Cleveland, Ohio.
McLennan Lumber Co., Montreal, Que.
Paepcke Leicht Lumber Co., Chicago, Ill.
Penrod, Jurden & McCowen, Memphis, Tenn.
Penrod Walnut & Veneer Co., Kansas City.
Pickrel Walnut Co., St. Louis, Mo.
Read Bros., Limited, Toronto.
Spencer, C. A., Montreal, Que.

HUB MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
Hydraulic Machinery Company, Montreal, Que.
Perrin & Company, Wm. R., Toronto, Ont.

INCANDESCENT LAMPS
Canadian Laco Philips Co., New York and Toronto.

JOINTERS
Canada Machinery Corporation, Galt, Ont.
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Williams Machinery Co., A. R., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

KNIVES (Planer and others)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
E. E. Gage Mfg. Company, Gardiner, Mass.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

LATHES
Canada Machinery Corporation, Galt, Ont.
Defiance Machine Works.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Foss & Hill Machinery Company, Montreal.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.

LUMBER
American Hardwood Lumber Co., St. Louis, Mo.
Anderson-Tully Co., Memphis, Tenn.
Barr-Holaday Lumber Co., Greenfield, Ohio.
Bennett Lumber Co., Montreal, Que.
Brown & Company, Geo. C., Memphis, Tenn.
Churchill, Milton Lumber Co., Louisville, Ky.
Clark & Son, Edward, Toronto, Ont.
Felger Lumber and Tmber Co., Grand Rapids, Mich.
Gayoso Lumber Company, Memphis, Tenn.
Graves, Bigwood Company, Toronto, Ont.
Hartzell, Geo. W., Piqua, Ohio.
Korn-Conkling Company, Cincinnati, Ohio.
McLennan Lumber Co., Montreal, Que.
Paepcke Leicht Lumber Company, Chicago, Ill.
Pickrel Walnut Co., St. Louis, Mo.
Read Bros., Limited, Toronto.
Shreiner Lumber Co., Pittsburgh, Pa.

MACHINE KNIVES
Canada Machinery Corporation, Galt, Ont.
E. E. Gage Mfg. Company, Gardiner, Mass.
Peter Hay Knife Company, Galt, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

MITRE MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

MITRE SAWS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.

MULTIPLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.

NITROGEN LAMPS
Canadian Laco Philips Co., New York and Toronto.

OILERS—SHAFT
Nugent & Co., Wm. W., Chicago, Ill.

OILING DEVICES
Nugent & Co., Wm. W., Chicago, Ill.

OILING SYSTEMS
Nugent & Co., Wm. W., Chicago, Ill.

PANELS
Waetjen & Co., George L., Milwaukee, Wis.

PATTERN SHOP MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PLANERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Wallace & Company, Chicago, Ill.
Whitney & Son, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

PLANING MILL MACHINERY
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Foss & Hill Machinery Company, Montreal.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont
Mattison Machine Works, C., Beloit, Wis.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

PRESSES (Veneer)
Canada Machinery Corporation, Galt, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Perrin & Co., Wm. R., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.

PULLEYS
Dodge Mfg. Company, Toronto, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

RED GUM LUMBER
Gum Lumber Manufacturers' Association.

RECORDERS (TIME)
Signal Systems, Limited, Toronto, Ont.

RESAWS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

We are not Playing Checkers

Every man-jack of us at the Carborundum plant is working like the proverbial beaver, for never before has there been such a demand for Carborundum and Aloxite Products.
We are doing our level best to meet this big demand—enlarging our plants, increasing our forces, speeding up production—we are even building a big 20,000 horse power furnace plant in Canada in our efforts to keep up with things. We have a definite service to perform for we are helping to produce the necessities of war.

Carborundum and Aloxite Products are Doing Their Bit

They are grinding shrapnel shells, high-explosive shells, rifle barrels and parts—grinding bayonets and sabers. They are grinding a hundred and one different parts of the aeroplane and the auto truck, the machine gun and the field gun. They are shaping armor plate and grinding car wheels; grinding plowshares, and the tools of the metal-working trades of the world. They are grinding torpedo tubes and torpedoes, grinding submarine engine bases; beveling the lenses of periscopes and buffing the soles of the army shoes and grinding the shears for the pocket kits of the "Sammies." They are doing a thousand and one war tasks quicker and better than they have ever been done before.

Carborundum and Aloxite products are surely doing their bit, but with it all we haven't neglected for one instant our regular patrons—we are doing all in our power to keep up with the pace; to keep up to the standards of Carborundum service.

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"Canadian Woodworker" Buyers' Directory—Continued

RIM AND FELLOE MACHINERY
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.

RIP SAWING MACHINES
Canada Machinery Corporation, Galt, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SAFETY DEVICES
Gustafson & Scott Mfg. Co., Chicago, Ill.
Imperial Machinery Co., Grand Rapids, Mich.

SANDERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Nash, J. M., Milwaukee, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SASH, DOOR & BLIND MACHINERY
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Williams Machinery Co., A. R., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SAWS
Atkins & Co., E. C., Indianapolis, Ind.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Radcliff Saw Mfg. Company, Toronto, Ont.
Shurly-Dietrich, Ltd., Galt, Ont.
Smith Co., Ltd., R. H., St. Catharines, Ont.

SAW GUMMERS, ALOXITE
The Carborundum Co., Niagara Falls, N.Y.

SAW SWAGES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Radcliff Saw Mfg. Co., Toronto, Ont.

SAW TABLES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SCRAPING MACHINES
Canada Machinery Corporation, Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass

SCREW DRIVING MACHINERY
Canada Machinery Corporation, Galt, Ont.

SCROLL SAWS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

SECOND-HAND MACHINERY
Cowan & Co., Galt, Ont.
Petrie, H. W., Toronto, Ont.
Williams Machinery Co., A. R., Toronto, Ont.

SHAFT OILERS
Nugent & Company, Wm. W., Chicago, Ill.

SHAPERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass
Yates Machine Co., P. B., Hamilton, Ont.

SHARPENING TOOLS
The Carborundum Co., Niagara Falls, N.Y.

SHAVING COLLECTORS
Sheldons Limited, Galt, Ont.
Toronto Blower Company.

SHOOK BUNDLER
Neilson & Company, J. L. Winnipeg, Man.

SPRINGS FOR UPHOLSTERY
Foster Bros. Mfg. Co., Utica, N.Y.
Steele, James, Ltd., Guelph, Ont.

STAINS
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

STEAM APPLIANCES
Darling Bros., Montreal.

SINGLE SPINDLE BOXING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

STAVE SAWING MACHINE
Whitney & Sons, Baxter D., Winchendon, Mass

STEAM TRAPS
Canadian Morehead Mfg. Co., Woodstock, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

STEEL BOX STRAPPING
Acme Steel Goods Co. of Canada, Ltd.

STEEL SHELL BOX BANDS
Acme Steel Goods Co. of Canada, Ltd.

SURFACERS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Petrie, H. W., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

SWING SAWS
Canada Machinery Corporation, Galt, Ont.
Cowan & Co., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Radcliff Saw Mfg. Co., Toronto, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

TABLE LEG LATHES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Mattison Machine Works, C., Beloit, Wis.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

TABLE SLIDES
Walter & Co., B., Wabash, Ind.

TEMPERATURE REGULATORS
Canadian Powers Regulator Co., Toronto, Ont.

TENONING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

TELEPHONES—PRIVATE SYSTEMS
Signal Systems, Limited, Toronto, Ont.

TRIMMERS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Preston Woodworking Machinery Company, Preston, Ont.
Yates Machine Co., P. B., Hamilton, Ont.

TRUCKS
Sheldons Limited, Galt, Ont.
National Dry Kiln Co., Indianapolis, Ind.

TUNGSTEN LAMPS
Canadian Laco-Philips Co., New York and Toronto.

TURNING MACHINES
Defiance Machine Works, Defiance, Ohio.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Mattison Machine Works, C., Beloit, Wis.
Whitney & Sons, Baxter D., Winchendon, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

UNDER-CUT SELF-FEEDING FACE PLANER
Falls Machine Co., Sheboygan Falls, Wis.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.

UPHOLSTERING SPRINGS
Steele, James, Ltd., Guelph, Ont.

VARNISHES
Ault & Wiborg Company, Toronto, Ont.

VARNISH SPRAYERS
DeVilbiss Mfg. Co., Toledo, Ohio.
Paasche Air Brush Company, Chicago, Ill.

VENEERS
Bury & Company, Robert, Toronto, Ont.
Clark Veneer Co., Walter, Grand Rapids, Mich.
Empire Veneer Company, Chicago, Ill.
Hartzell, Geo. W., Piqua, Ohio.
Hoffman Bros. Company, Fort Wayne, Ind.
Geo. Kersley, Montreal, Que.
Nartzik, J. J., Chicago, Ill.
Ohio Veneer Company, Cincinnati, Ohio.
Penrod, Jurden & McCowen, Memphis, Tenn.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Roberts Veneer Co., New Albany, Ind.
Toronto Veneer Company, Toronto, Ont.
Wactjen & Co., George L., Milwaukee, Wis.

VENEER TAPE
Ideal Coated Paper Co., Brookfield, Mass.

VENTILATING APPARATUS
Sheldons Limited, Galt, Ont.

VENEER JOINTERS
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.

VENEER PRESSES (Hand and Power)
Canada Machinery Corporation, Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Perrin & Company, Wm. R., Toronto, Ont.

VISES
Fay & Egan Co., J. A., Cincinnati, Ohio.

WAGON AND CARRIAGE MACHINERY
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass
Yates Machine Co., P. B., Hamilton, Ont.

WATCHMAN'S CLOCKS
Signal Systems, Limited, Toronto, Ont.

WOOD FINISHES
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

WOOD TURNING MACHINERY
Canada Machinery Corporation, Galt, Ont.
Defiance Machine Works, Defiance, Ohio.
Garlock-Walker Machinery Co., Toronto, Ont.
Waymoth & Co., A. D., Fitchburg, Mass.
Yates Machine Co., P. B., Hamilton, Ont.

WORK BENCHES
Fay & Egan Co., J. A., Cincinnati, Ohio.

WOODWORKING MACHINES
Canada Machinery Corporation, Galt, Ont.
Elliot Woodworker Limited, Toronto, Ont.
Falls Machine Co., Sheboygan Falls, Wis.
Garlock-Walker Machinery Co., Toronto, Ont.
Jackson, Cochrane & Company, Kitchener, Ont.
Mattison Machine Works, C., Beloit, Wis.
Preston Woodworking Machinery Company, Preston, Ont.
Williams Machinery Co., A. R., Toronto, Ont.

WHEELS, Grinding, Carborundum and Aloxite
The Carborundum Co., Niagara Falls, N.Y.

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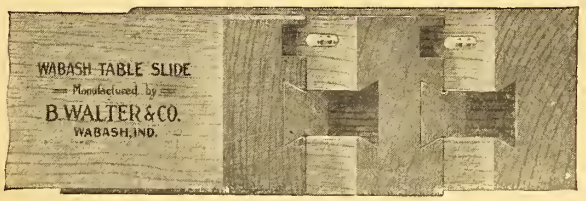

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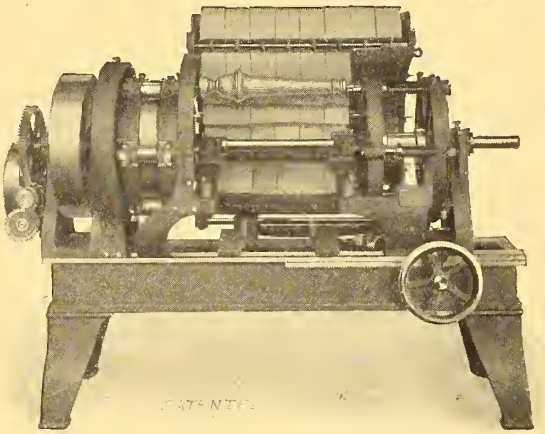
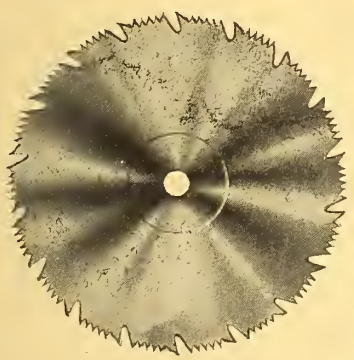


The Nash Sander can do the work of five to fifteen men, and do it better.

Let me give you details

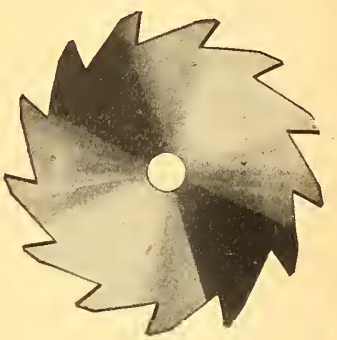
J. M. NASH, Milwaukee, Wis.



ATKINS

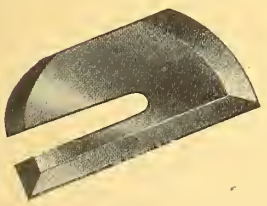
STERLING QUALITY

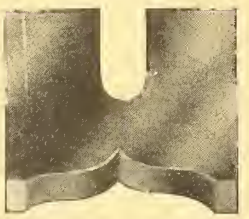
SAWS and KNIVES



The best steel—the most careful and accurate workmanship—the equipment that will eventually save you money.

Atkins Sterling Quality Saws and Knives are proving their superiority by competitive tests in the largest plants of the country. We welcome your most careful investigation, as we know the satisfaction that will result.





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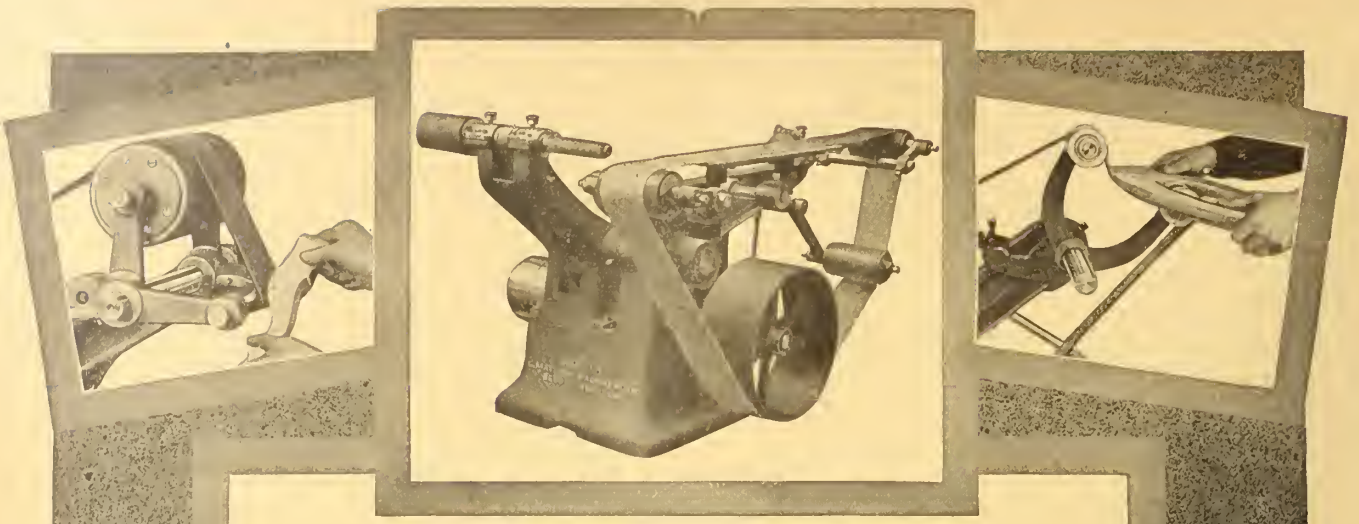
E. C. ATKINS & CO.

Makers of Sterling Saws

Factory—HAMILTON, Ont. **Vancouver Branch—109 Powell Street**



For the "Thousand and One" Odd Jobs

This is a new Mattison Belt Sander for the rapid sanding of small and irregular shaped work which can be held free-hand against open belt, sanding rolls or spindles.

In this one machine are combined the various sanding applications necessary to reach the many curves and irregularities of such pieces as the popular Cabriole Leg, also serpentine drawer fronts, cross-banded O.G. mouldings, bent-wood Chair Backs and seat frames, closet seats and covers, etc., etc. Nearly every factory has a makeshift machine for odd jobs and this versatile sander is to replace that old-time, inaccurate equipment, in the interest of better finish, procured with less effort and in much shorter time.

It is self-contained, requires only a little floor space and can be set up in many different ways for an infinite variety of work. Most work can be completely sanded in one handling, because of the compact arrangement of open belt, forms, rolls, and spindles.

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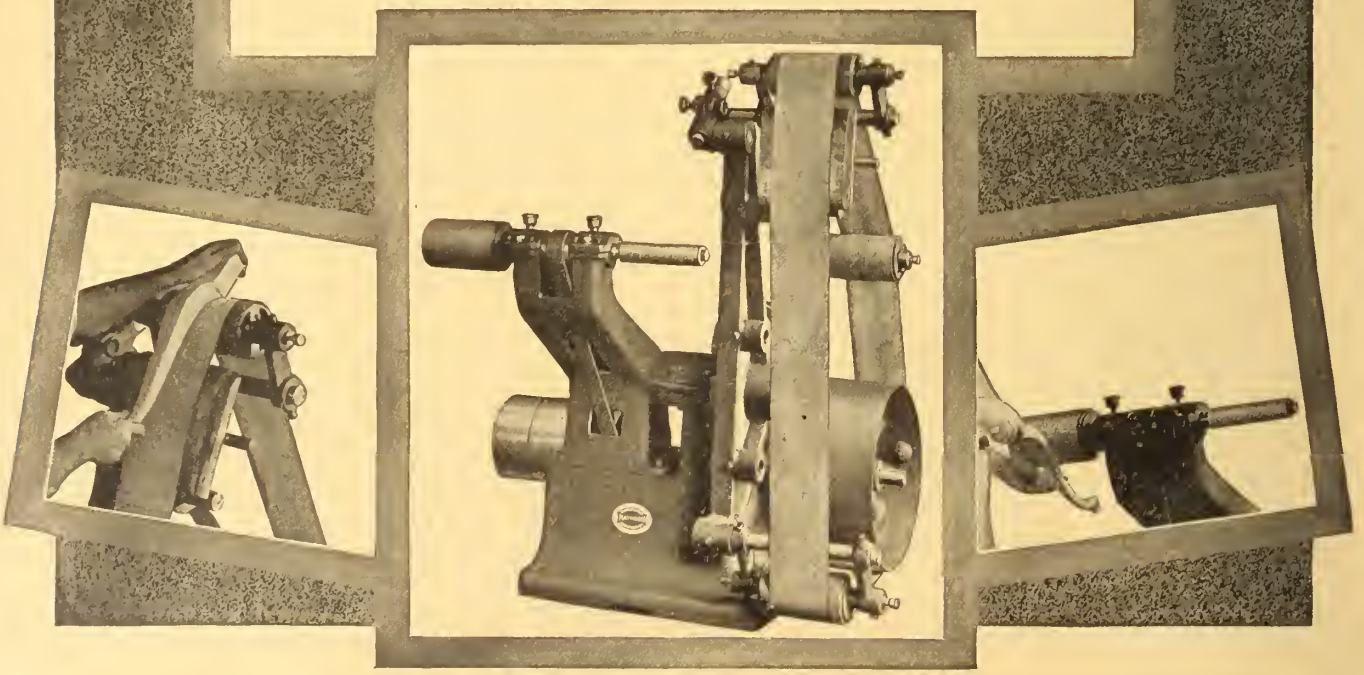
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